

Adventures in **FUGAWILAND!**

1989
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Best Social Science
Software and
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EDUCOM/
NCRIPTAL

**A Computer
Simulation in
Archaeology**

Doug Price
Gitte Gebauer



Adventures in Fugawiland

*A Computer Simulation
in Archaeology*

*Version 2.0
1989*

*Doug Price & Gitte Gebauer
University of Wisconsin – Madison*



*Mayfield Publishing Company
Mountain View, California*

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PREFACE

Designed as an extended exercise for introductory archaeology or general anthropology courses, *Adventures in Fugawiland* is an interactive computer program that gives students an idea of what it's like to excavate sites and study archaeological data. With the help of this computer simulation and the accompanying workbook, students will be introduced to some of the fundamentals of archaeological research. Using the computer as an electronic shovel and trowel, students will excavate 10 of 25 fictitious, but realistic, prehistoric sites; transform data into bar charts and scatter graphs; analyze site plans, maps, drawings, and graphs; and prepare a report of their investigations that reconstructs Fugawiland's prehistory.

Adventures in Fugawiland operates on any IBM or IBM-compatible computer with a floppy disk drive and a graphics card. Students need no computer skills: abundant help screens make the program extremely user-friendly. The workbook explains how to use the computer and the simulation.

Fugawiland has been very well received by our students at the University of Wisconsin. Not only do they enjoy the "arcade" aspect of the courseware, but they also are challenged by the problem-solving they undertake. Preliminary versions were used at several campuses around the country, and the student responses were very helpful in refining the final version.

Fugawiland has been several years in the making. A number of individuals and institutions have played a role in the process. The initial idea grew out of course work with Henry Wright and Bob Whallon at the University of Michigan, and the basic format developed as an assignment for a course in statistical methods in archaeology at the University of Wisconsin-Madison. Through a grant of equipment from IBM as part of Project Trochos at the University of Wisconsin-Madison, *Fugawiland* became computer courseware. The College of Letters and Science provided funding for student programmers and commercial software for development.

Following suggestions from colleagues, students, and friends, we have enhanced the initial version. Once the program stopped crashing regularly, we experimented with using it in our large introductory classes. Susan Kepecs and Beth Workmaster, teaching assistants for our introductory archaeology courses, mastered *Fugawiland* and helped to sort out any problems that students encountered. Michael Kolb wrote much of the initial computer code for *Fugawiland*, Joel Boaz added further refinements, and Rich Wahls revised and improved the final copy.

Jan Beatty at Mayfield encouraged us to put together this workbook to accompany the program. Mickey Kienitz of the University of Wisconsin News Service took many of the excellent photographs of archaeologists at work on pages 10, 11, 14, 24, 25, and 28. Other photos of fieldwork (pages 20, 22, and 23) came from Jim Stoltman at the University of Wisconsin-Madison. Jay Rath is the creative artist behind the illustrations that appear throughout the workbook. Larry Bartram provided the concept for the dating problem in the report section. Working with all these individuals has been one of the pleasures of this project.

We have gone through several iterations of *Fugawiland* and now have a version that is both simple to use and thought-provoking. Sincere thanks and appreciation go to all the folks who developed, tested, swore at, and critiqued what is now *Fugawiland*. We'd especially like to thank the reviewers of the most recent version: Sarah K. Campbell, Western Washington University; Jerald Johnson, California State University, Sacramento; and David V. M. Stephen, Pima Community College.

We hope you enjoy it, and we welcome your comments for improvements.

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For Jennifer, Erika, and Uffe



PART ONE

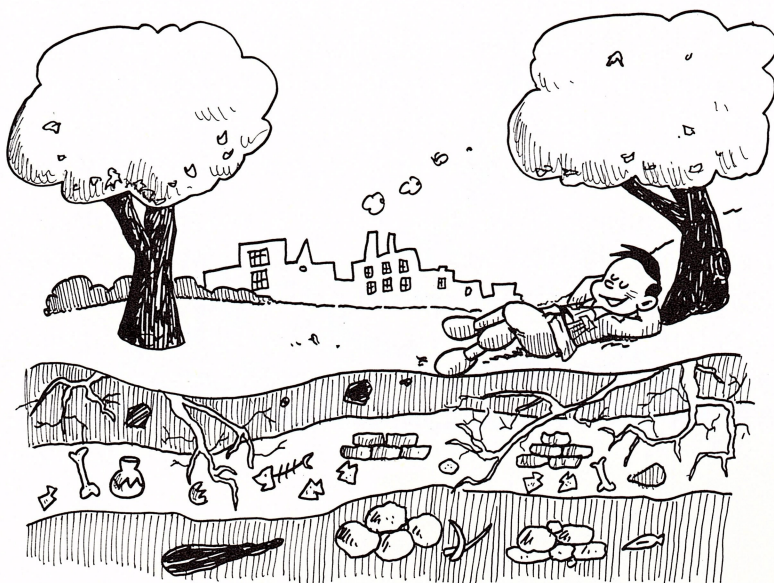
AN INTRODUCTION

You are about to embark on an expedition of archaeological discovery. Fugawiland is a computer program that is intended to give you an idea of what it is like to excavate prehistoric sites and to study archaeological information. Fugawiland is also an exercise for your archaeology class.

Most archaeological materials lie beneath the ground, invisible to the naked eye, and are very expensive and time consuming to uncover. A computer, however, can simulate both the archaeological data and what archaeologists actually do — things that are difficult to grasp just from reading textbooks or scientific articles. Maps and drawings produced by the computer offer new views of archaeological data.

Fugawiland should provide you with a sense of how archaeological sites appear on the landscape, what aspects of the environment may be important to the human existence, what the basic information looks like, how archaeologists think about their data, and the problems they face.

The Program



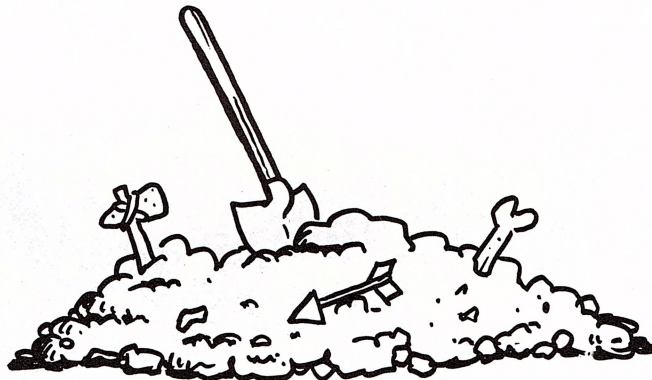
The Workbook

This workbook is intended to lead you through Fugawiland. The computer program is largely self-explanatory and "user-friendly," but successful completion requires some time with this workbook. The workbook is a kind of manual that you follow and fill in as you go along.

Use the workbook for a log of your activities, both in the Reports section in Part Four and throughout the book. Use the margins for notes, sketches, and recording other information that you may need later. When you have completed the assignment, both in the workbook and in the computer program, turn in the printed answer sheet from the computer along with Part IV from this workbook to your instructor.

Workbook Sections

The workbook has several major parts. Part Two is a general discussion of concepts and how archaeologists discover and excavate sites. Part Three is a detailed discussion of the Fugawiland computer program and how to use it. Part Four is the section where you write a report of your investigations concerning your study of Fugawiland. This is what you will turn into your instructor. Part Five contains information about other archaeology books and articles of interest, about opportunities for actual archaeological fieldwork, and a glossary of terms used in the book.



Doing Archaeology

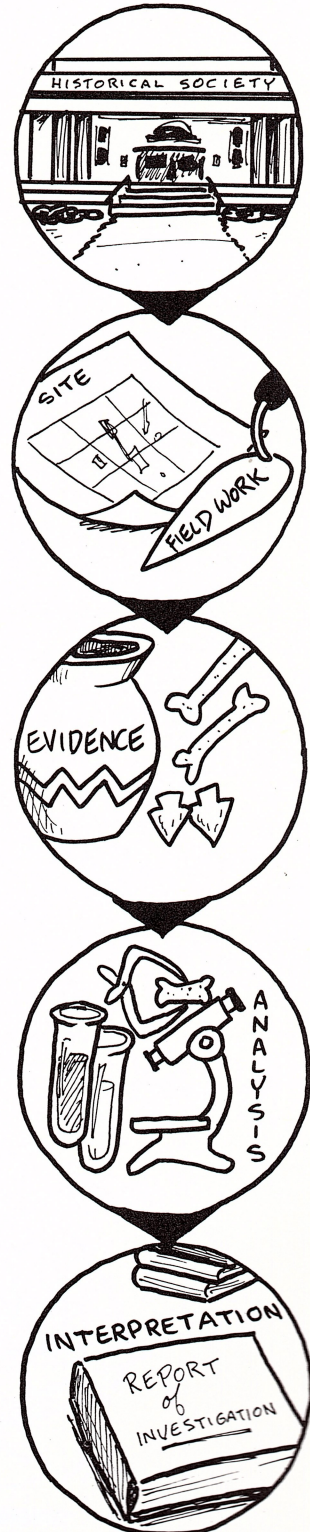
Part Two, Doing Archaeology, concerns some of the methods and concepts of archaeology. This part includes Chapters I through III. Chapter I, The Discovery of Archaeological Sites, describes how archaeological sites are found and describes some aspects of archaeological survey. Chapter II, Archaeological Excavation, discusses the methods of archaeological excavation and how archaeologists obtain information about the past. Chapter III, Analysis and Interpretation, is concerned with archaeological analysis and interpretation. It is a description of how archaeologists examine the materials recovered in excavations and how they assemble an understanding of the past.

Adventures in Fugawiland

Part Three, Adventures in Fugawiland, is intended to expose you to prehistoric archaeology through a computer simulation of a large study area, a series of archaeological sites, and a variety of artifacts — a hierarchy of archaeological information. This part of the workbook is organized to take you through the computer simulation and to provide additional information about archaeological investigations. Part Three includes Chapters IV through XII.

Chapter IV, About Fugawiland, is an introduction to the simulation and an overview of what to expect. Use this chapter as a guide for your travels through Fugawiland. Chapter V, Using the Computer, contains the basic directions you will need to control the program. Chapter VI describes the Help Sections of Fugawiland.

Chapter VII, Map of Fugawiland, and Chapter VIII, Excavating Sites, are intended to provide you with more information about specific aspects of archaeological research, including finding sites, excavating, and analyzing the data from such studies. Chapter IX, Site Plans, describes the drawings and contents of the sites that you excavate.



Chapter X, Analysis of Data, provides some instructions and ideas about how to look at the information you have collected in the excavations. This is the heart of the Fugawiland exercise, where you consider the archaeological information you have collected. Chapter XI, Multiple Choice Questions, is the testing section of Fugawiland. Chapter XII, Exiting the Program, describes how to leave Fugawiland at any time.

An Archaeological Report

Part Four, Report of Investigations in Fugawiland, is the section where you summarize the results of your study of Fugawiland and the prehistoric human groups that lived there. The multiple choice questions in the program are an objective way of checking what you have learned about Fugawiland. The Report of Investigations in the workbook is more of a summary of your thoughts and impressions of Fugawiland. Try to describe how the people lived, their technology, what they ate, seasonal changes in their lives, and their beliefs. **Be sure to fill in all the information, drawings, and so on requested in your Report of Investigations.**

Miscellaneous

Part Five contains other information about archaeology and Fugawiland. For Further Study is a list of some suggested books and articles on archaeological concepts and fieldwork, method and theory, that may be of interest if you want to know more about the subjects discussed in this workbook. This section also has some information on opportunities for archaeological fieldwork. The Glossary contains terms and definitions used in the Fugawiland workbook. Technical words in the text are indicated in **bold** and defined in the glossary. **Bold words and sentences** are also used to indicate specific things you need to do as part of the assignment.

Last, but not least, this exercise is intended to be fun, so grab your electronic shovel and adventure in Fugawiland.

PART TWO

DOING ARCHAEOLOGY



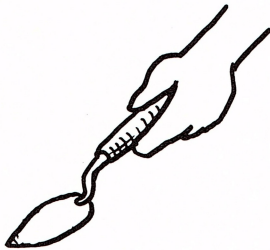
CHAPTER I

THE DISCOVERY OF ARCHAEOLOGICAL SITES

Archaeology

Archaeology is the study of the human past, from the time of our earliest ancestors, some 5 million years ago, to the historical present. The basic information archaeologists use to learn about the past comes from artifacts and sites. **Artifacts** are the objects and materials that people have made and used. **Sites** are accumulations of such artifacts, representing the places where people lived or carried out certain activities. Much of the information gathering for archaeological studies requires **fieldwork** that is intended to discover artifacts and sites.

Fieldwork



Artifacts and sites are found either on the surface or beneath the ground. **Surveys** are used to discover artifacts on the ground and **excavations** are used to expose buried materials. These are the discovery techniques of archaeology. This chapter tells you about archaeological surveys and how prehistoric sites are discovered. The next chapter focuses on the techniques of archaeological excavations.

Fugawiland

One way to think about the problem of discovering archaeological sites is to consider a hypothetical area like Fugawiland. To understand the past in a place like Fugawiland, archaeologists must find the locations where people lived and left the remains of their residence and activities. Finding sites requires a combination of methods that include research in libraries and archives and fieldwork.



The discovery of archaeological sites depends in part on what is already known about an area in terms of its landscape, environment, and history. The first thing to do is check all the relevant *written material* on the area. This research will reveal the present state of knowledge, indicate what is not known, as well as what is, and help establish a direction for further research. Such library research is essential to insure that an investigation, like the one you want to do, has not already been done.

Archival Research

The next step is a visit to the local *Historical Society*, or other archaeological institutions such as museums or university departments where records of the area are maintained. Such places generally keep an archive of information on the location and contents of known archaeological and historical sites. Study of these archives will indicate what types of sites are already known, and perhaps their size and general content of artifacts. This information can provide an initial list of sites in the area and their locations on maps. The maps will also indicate elevation, degree and orientation of slope, distance to fresh water, and type of soil for the known sites.

Aerial Photos

Aerial photographs also can provide information on the location of archaeological sites. Old foundations or prehistoric agricultural fields, overgrown with vegetation and almost hidden on the surface, may appear in aerial photographs. When prehistoric structures were originally abandoned, the depressions they left often filled with rich top soil. This meant better growth condition for vegetation. In fields of wheat, for example, such different soil conditions might result in a distinctive pattern showing the outlines of houses or whole villages. Such patterns are best observed from low-flying planes during a dry period in the early summer.

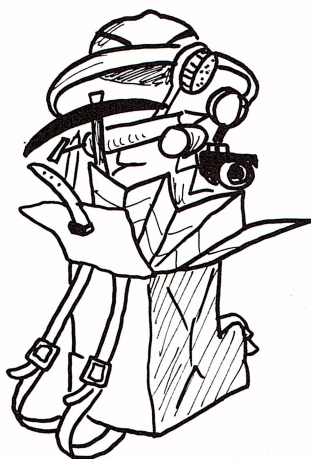
Place Names

Place names provide another source of information useful for understanding the archaeology of certain areas and time periods. The origin and meaning of place names can reveal information on who earlier settlers were and what activities or resources attracted people to the area. In Wisconsin, for example, the town of Mineral Point was an early settlement where pioneers mined zinc and lead ores.

Survey

The next stage involves fieldwork. An **archaeological survey** is a search of the landscape for artifacts and sites. It usually is not possible to make a complete survey of

the entire area under investigation. Often it is necessary to thoroughly survey only a portion of the entire area, but that portion somehow should be representative of the larger area of the investigation.



As a start all land owners in the selected areas should be contacted to learn what they have found on their land, to examine any private collections they may have, and to obtain permission to survey their property.

The basic type of archaeological survey involves systematic field walking. This means hiking up and down cultivated fields and exposed surfaces to examine the ground for traces of prehistoric activities. The intervals between the walks are determined by the size of the sites that may be expected in the area. If the smallest sites are likely to be 20 meters in diameter, there is a good chance of finding them by walking with intervals of 10 - 15 meters. It may also be necessary to walk over an area several times during the year, or over several years, to collect enough artifacts to determine the contents and age of a site.

Field Walking

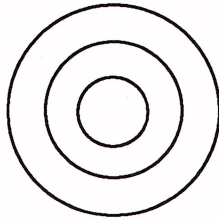
When an artifact is found, the object is collected and the location of the find is recorded. The surrounding area should be searched carefully by walking back and forth at close intervals or in a spiral centered at the find spot. It is important to establish whether the artifact is a single isolated find or whether there are more artifacts, or other evidence on the surface, which might indicate features like fire places or pits. If there is a site, it is important to determine the extent of the area covered by artifacts to estimate both the size of the site and the density of artifacts.

Recording Information

Notes must be taken regarding each new site that is discovered. These field notes should include information on (1) the location, site number, map number, field, and location in the field, (2) what was found, the types and number of artifacts, fire-cracked stones, charcoal, etc., and (3) observations about the site, discoloration in the soil that might indicate prehistoric layers or pits, the presence of mounds, nearby streams or water, etc.

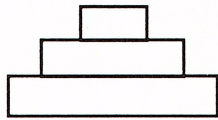
A description of the conditions for making observations might also be useful for later comparison of the evidence found in different places at different times. A newly ploughed field where stones and pot sherds have been exposed by a recent rain offers the optimal conditions for surveying. Vegetation, lots of stones in the ground, or dim light make observations much more difficult.

Mapping the Site



Top layer

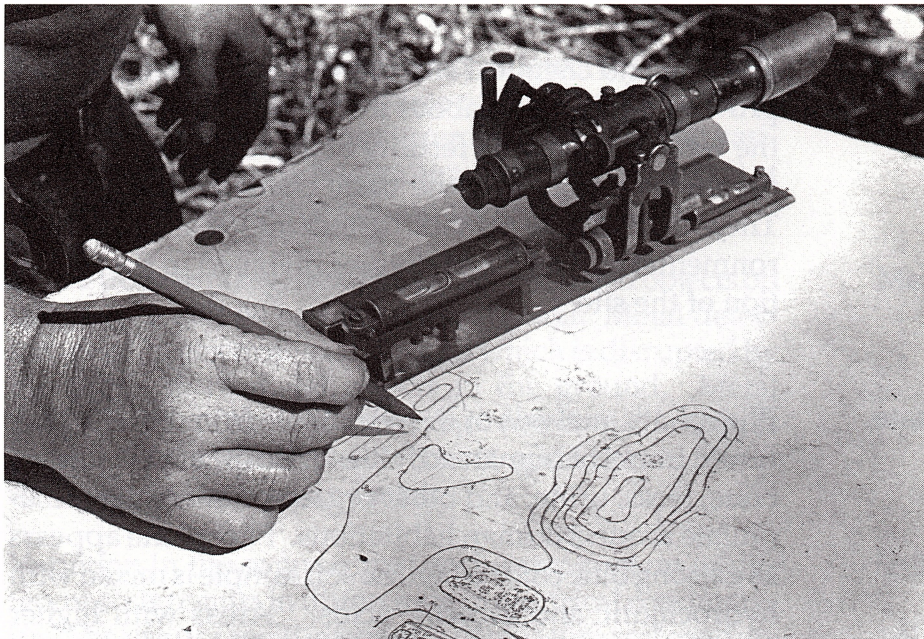
Bottom layer



The topography of a site is recorded in the form of a **contour map**. A grid is laid out and measurements of the elevation of the ground are made at regular intervals across the field. Contours are then drawn on the map by sequentially enclosing areas within the same range of elevation within concentric lines. The result looks something like a wedding cake seen from above. Elevations are measured with surveying instruments, like a level or an **alidade**. Information from the surface collection is mapped on the contour map to provide a better picture of the location and distribution of the finds. Horizontal and vertical measurements of artifacts at the site are described in more detail in the next chapter.



A site is found. Intensive surface collections are made in order to pick up artifacts that may help date the site. One archaeologist holds a stadia rod to measure the elevation.



A contour map is made by recording the measurements of elevation taken across the site and their locations on the site grid. Contour lines are then drawn by connecting points with similar elevations. An alidade sits on the drawing table.

Archaeological data are often buried in the ground beneath the sediments that have accumulated since their deposition. Objects found on the surface are brought up from deeper layers through agricultural or animal activities or uncovered by erosion. Materials found on the surface can only provide a partial indication of the information to be obtained from a **site**.

Buried Sites

Once buried sites have been located by survey and mapped, other kinds of fieldwork are used to learn more. Drilling or boring into the ground with an auger or corer produces a column of soil showing the sequence of layers and samples of sediments for further analysis. Small test pits dug into the ground can provide similar information and might be necessary to determine if a cultural layer is present at the site. A number of corings and/or test pits often are made, following a regular pattern over the surface of the site. Soil samples should be collected from all parts of the site and at different depths.

Corings & Test Pits

Soil Analysis

Physical and chemical analysis of the soil samples may provide information about the origins of the deposits, the water content and fertility of the soil, the amount of organic material, and the basic chemistry of the soil. These studies may provide further information on environmental and human activities involved in the formation of the site.

Phosphate

Phosphate analysis of the sediments from the site may reveal traces of human activities. Phosphate is found in bone, feces, urine, and other organic matters that accumulate around human habitations. Phosphate appears as a strong blue color when the soil sample is mixed with hydrochloric and ascorbic acids. Areas with higher concentrations of phosphate will show up as stronger blue colors in such analyses.

Phosphate testing may supplement surface surveys in areas where vegetation prevents observations of the surface or where cultural layers are deeply buried under the top soil. Within a known area of habitation, these tests may be used to determine the extent of the site and detect special areas such as house floors. Burial locations where the skeleton itself has disintegrated may sometimes be revealed.

Soil Contents

Other objects in the soil are also informative. Materials found in soil samples often include pieces of wood and plants, seeds, pollen, fragments of insects, mollusk shells, or chips of bone or stone. Such items provide information on the formation of the layers, the local environment, and the nature of past human activities. For example, small chips that result from the manufacture of arrowheads and other stone tools can show up in such borings, indicating that buried artifacts may be present.

Geophysical prospecting is used to detect disturbances in the subsoil and the presence of prehistoric features. Such methods include measurements of magnetic variations in the ground, the conductivity (or "resitivity") of the soil, and the use of ground penetrating radar.

Prospecting Methods

Metal detectors register the presence of metal objects on the surface and objects buried in the soil. Metal detectors emit an electromagnetic field which is disrupted by the presence of metal objects in the ground. Metal detectors are of limited value since non-metallic objects are not detected and most archaeological sites in North America do not contain metals.

Metal Detectors

Variation in the composition and water content of different soils results in differences in electrical conductivity. The use of a **resitivity meter** to measure soil conductivity can provide a map of soil differences which may be related to the presence of prehistoric disturbances such as fireplaces, house foundations, or burials.

Soil Resitivity

The use of ground penetrating radar is a relatively new technique for studying archaeological sites. Electromagnetic waves in the form of "**georadar**" are sent into the ground, something like the sonar used in submarine hunts. Low energy radar waves register anomalies in the subsoil which appear on a graph. Such anomalies or disturbances may be caused by nature or by human activities. Excavation is usually required to identify such disturbances.

Georadar

In sum, prehistoric sites are found through a combination of archival research and fieldwork. Archival research provides information on what is already known about an area. Fieldwork often results in the discovery of the unknown. When new sites are discovered, surface survey, testing, boring, and several geophysical methods are available to determine the size and possible contents of the prehistoric deposit. However, once a site is discovered and defined from the surface, excavations are often necessary to expose what lies beneath the surface of the ground.

Summary

CHAPTER II

ARCHAEOLOGICAL EXCAVATION

Excavation

Excavation is the technique that archaeologists use to uncover buried remains from the past. Buried materials usually are more abundant and better preserved than those found on the surface. In addition, much more accurate information can be recorded on the arrangement and relationships of structures, artifacts, plant and animal remains, and other materials. Thus, excavation often is essential to obtain useful information about the past.

Research Questions

Excavations are conducted to answer specific questions that the archaeologist has about the past. Who lived at the site, what did they eat, what did they do there, where did they get raw materials for making tools and equipment, what kinds of relations did they have with their neighbors, how was their society organized and structured?

At the beginning of an excavation, topsoil is removed by shoveling to determine the extent of the buried traces of human activity.



The Excavation Director

Directing an excavation requires a variety of skills and knowledge for the tasks of planning the field season, raising funding to pay for the work, supervising and training the field crew of students or volunteers, recording information from the site in drawings and photographs, and measuring and mapping the location of all finds, samples, and features. The investigator must monitor progress in the field laboratory as well, where finds are washed, sorted, cataloged, and bagged for storage. Some knowledge of preservation techniques also is necessary to conserve fragile objects.

Excavations require reams of paper work and recording. The director must keep an excavation log or diary, recording the course of the excavations, the work schedule, the number of people working, accounts of expenses, the location and dimensions of excavation areas, layout of the measuring system, and important finds. There must be recording systems for all measurements, for observations and interpretations, for all drawings, photos, and samples.

Records

Selecting Sites for Excavation

The choice of which site to excavate is determined by several factors, including danger to the archaeological remains. Sites are often chosen for excavation because they appear to be well preserved or to contain new information that will help to better understand the prehistory of a particular region. However, archaeological sites are being ruined at an enormous rate by the growth and development of modern society and there is a serious concern about the loss of undisturbed sites for future research. Sites threatened by modern construction should be selected for excavation whenever they may fulfill the requirements of the study.

The choice of a site for excavation is often based on the results of a survey. An initial survey of an area, including corings and testing of promising sites, might indicate that one or a few sites would be worth excavating. Excavations are very costly in both time and money. Careful surface collection and testing must be carried out at the site selected for excavation in order to make sure the site can provide the kinds of information that are needed and to assist in planning the excavation.

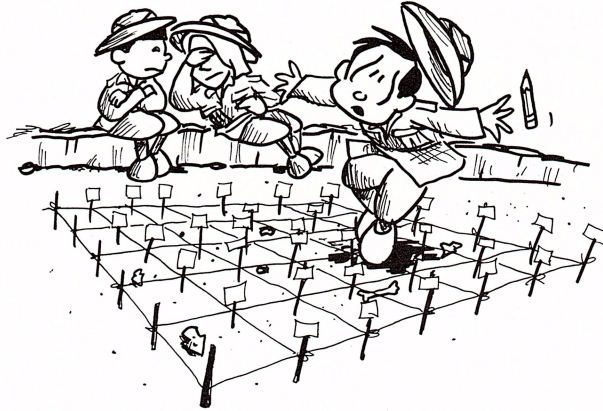
Excavation Strategy

It is important to know as much as possible about a site prior to full scale excavation in order to choose the best strategy for the project. At every excavation, the archaeologist is faced with a series of decisions about how to obtain the best information under the circumstances. In an ideal situation, a site could be fully excavated and everything recorded in the finest detail. In the real world, however, constraints on time and funding, and a need to leave a part of the site for the future, make it possible to excavate only a portion of the total site.

Maps and Grids and Test Pits

Site Grid

Accurate mapping of layers and artifacts is the key to the proper recording of information at an archaeological excavation. The exact **topography** or shape of the site must be recorded in the form of an accurate contour map, made by using a surveying instrument and the **site grid**. A grid, to be used for all horizontal measurements, is marked out across the surface of a site prior to the excavation. The site grid is a coordinate system with lines running north - south and east - west at regular intervals. These intervals along the two axes of the grid are designated with a system of letters or numbers or both. The grid lines and all locations within each grid square are measured as distances in meters and centimeters north and east of the base lines at the edge of the excavations. An example of a such a grid can be seen in the Report of Investigations in Part Four.



The site grid might also be oriented according to local topography. At coastal sites, for example, trenches are sometimes excavated perpendicular to the coastline in order to study stratigraphy and site formation in relation to the coast. In a narrow cave, the grid is often aligned to the long axis of the cave.

The location of the site and the site grid in relation to elevation and global latitude and longitude must be determined. A control point or site datum must be located in the neighborhood of the excavation as a point of origin for vertical measurements. A pre-existing datum point like a surveyor's benchmark may be used if available. Otherwise a permanent feature like a rock outcrop or building foundation might be marked and used as the datum point. The location and elevation of this point must be established in relation to known points like geographic features or distant benchmarks.

The Datum

Vertical locations in the excavation are best determined using an instrument like a surveyors' level, set at a known elevation, and sighting on a vertical measuring rod. Measurements at the site should be recorded in meters above sea level or the elevation of the datum line may simply be recorded.

Recording Measurements

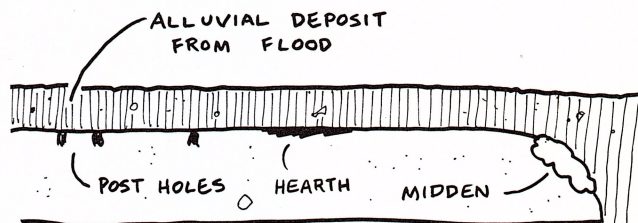
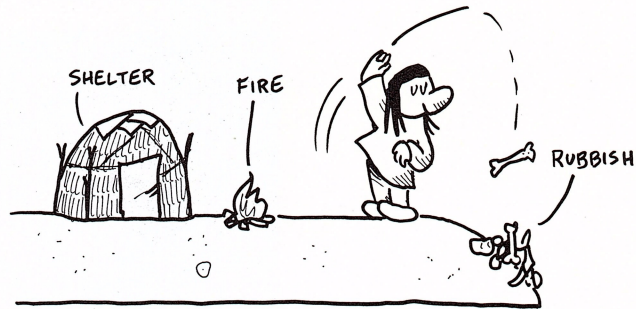
Test Pits	Preliminary examination of a site involves digging a series of small test pits, perhaps 1 x 1 meter in size. The size and number of test pits to be excavated depends on the kind of information needed. The test squares to be excavated might also be placed in rows or a chessboard-like pattern across the site or their location might be chosen by random sampling, as described in Chapter II.
Trenches	A complex stratigraphy may be difficult to see in small test pits. One or two long trenches cut across the site will provide a better view of such stratigraphy. Initial investigation of the site might be supplemented by phosphate analysis of soil samples collected across the site. Phosphate analysis may indicate that the site extends into areas where artifacts have not been observed on the surface or in the test pits.

Vertical Excavations

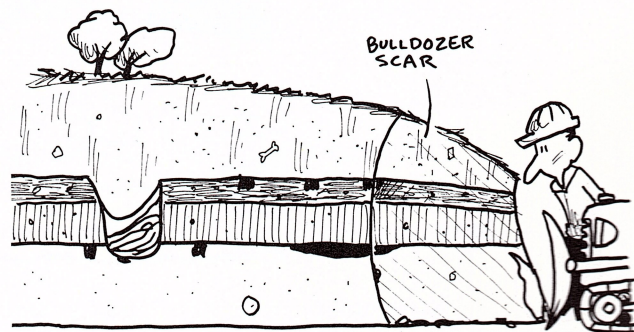
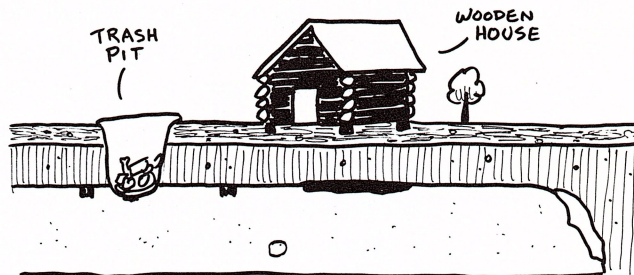
Excavations are generally either vertical or horizontal. Vertical excavation takes the form of test pits or trenches carefully placed across a site to expose the stratigraphy and artifact contents of a site. By studying the vertical walls (**section**) of such pits or trenches, stratified layers of the soil can be studied. The stratigraphy is recorded in both photos and drawing.

Stratigraphy	The stratigraphy of soil types and human deposits reveal how the site was formed and accumulated. The relationships between deposits in the stratigraphic sequence indicate the chronological arrangement of the layers. The bottom layer is deposited first as the oldest layer in the sequence while the upper layers are progressively younger, following the "law of superposition." The stratigraphic sequence provides a relative chronology where layers and the artifacts they contain are thus "younger than" or "older than" other layers and artifacts.
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The thickness of a layer does not necessarily depend on the length of time that it accumulated, but on the natural and human activities involved in the deposition of the materials. Heaps of shells may accumulate very rapidly into high shell middens; the collapse of houses with sod walls results in very thick layers; stone tool manufacture can produce extensive debris. On the other hand, the location where an animal was killed and butchered — a kill site — may leave almost no archaeological trace.



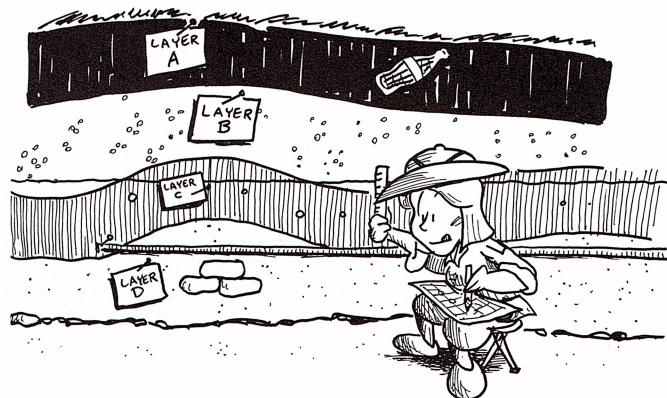
Evaluation of a stratigraphic sequence involves distinguishing between natural and human activities. Environmental factors like soil erosion or flood deposits may add to the local accumulation, but may also remove part of a layer. Younger features like post holes or storage pits may have been dug into older deposits. Relationship between layers must be studied carefully to determine whether younger deposits are cut into older layers and whether disturbances like animal activities, downed trees, floods, or later construction have disturbed or destroyed the original stratigraphy.





An excavation exposes the site stratigraphy. There are three prehistoric layers of shells in this test pit. The two younger layers are in the wall, while the bottom of the excavation has just reached the lowest level.

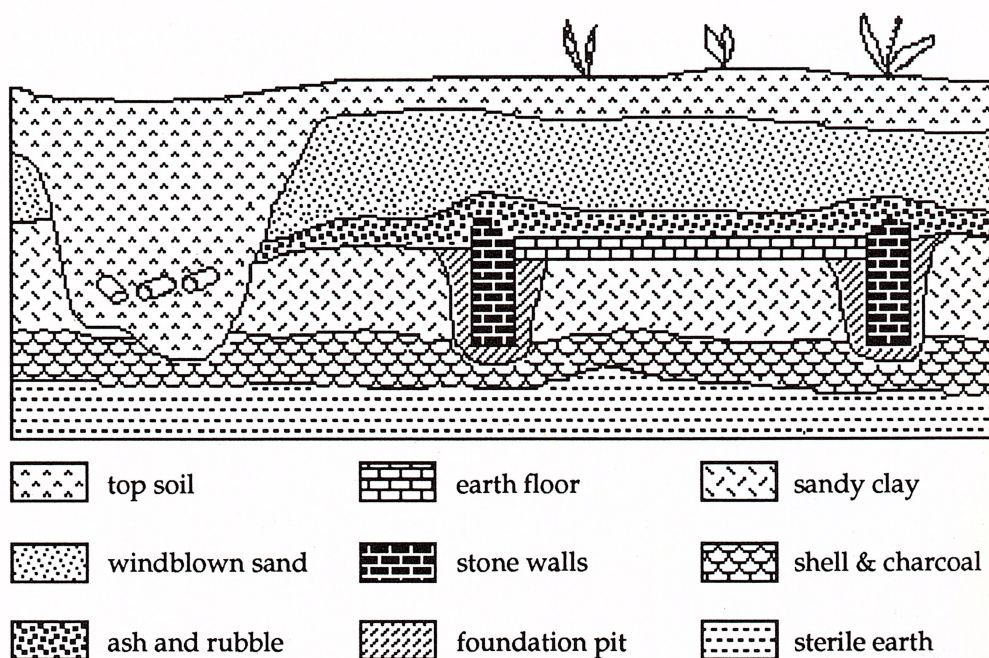
Assessment of the context and relative position of layers allows an archaeologist to interpret the depositional history of a site from the stratigraphic sequence. An actual calendar date of the layers may be derived from artifacts with a known date found in a particular layer. For example, a hubcap from a 1935 Ford would indicate that the layer was no older than 1935. The approximate ages of many types of prehistoric pottery and stone tools are also known and can be used to suggest a date for archaeological strata. Layers sometimes may also be dated by means of absolute techniques like **radiocarbon dating**.



The drawing of stratigraphy below shows an example of a sequence of deposits in the ground, including three episodes of human activity. The basal layer of sterile earth was first covered prehistorically by a layer of shells and charcoal which accumulated as a midden from the garbage from eating shell fish. This shell layer was covered by sandy clay that was deposited by a river flood.

Example

A house later was built on top of the sandy clay layer. The foundation trenches for the house walls were cut through the sandy clay and into the older midden beneath. The house was destroyed by fire and a dark layer of ash and rubble covered the area in and around the house. Subsequently, a sand storm buried the area completely in a thick layer. Finally the growth of vegetation created a layer of top soil in the upper part of the sand layer. Most recently, a pit was dug into the top soil, through the sand, the house remains, the sandy clay, and into the shell midden. The pit was then filled with topsoil and trash.

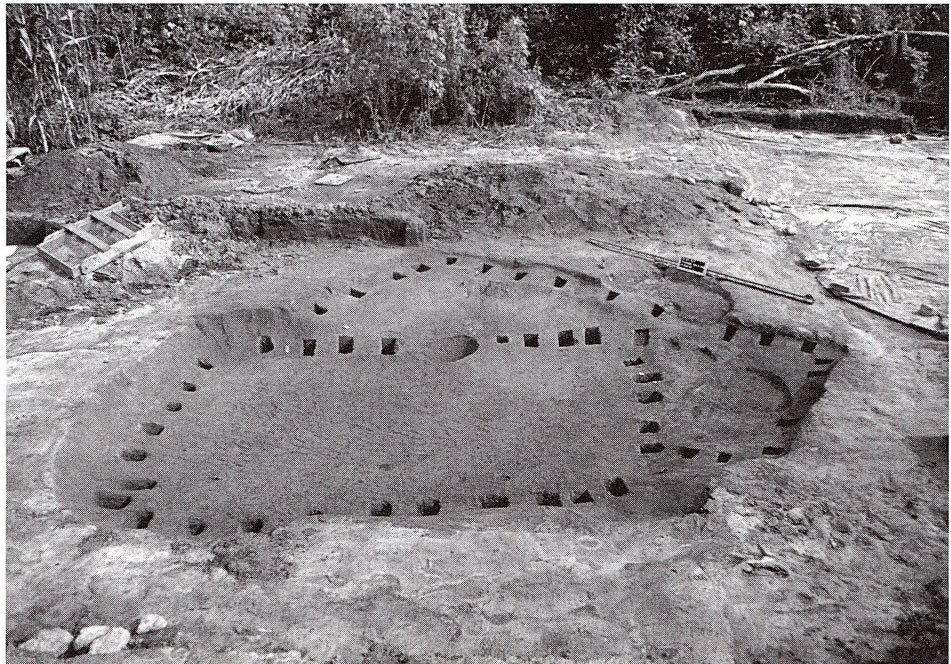


Horizontal or Area Excavations

Horizontal or area excavations are often the next step after the initial vertical trenches reveal structures or features to be uncovered. Horizontal or area excavations expose large open areas of ground, one layer at a time. Area excavations are intended to recover information on site arrangement and structures. Such excavations may expose actual prehistoric living floors where a group of people carried out every day activities.

Postholes

Holes were often dug in the ground to insert a wooden post for construction. Such **postholes** provide a great deal of information on the nature of structures and site arrangement. A complex network of postholes or walls may appear within the exposed area, revealing the outline of houses, fences, or other structures. Postholes filled with one kind of soil to the same depth can be connected to indicate a single stage of construction. If postholes filled with one type of soil were dug into postholes with another kind of soil, the former is likely the result of a younger construction period.



Excavations expose the foundations of two houses, one built over the other. The dark rectangles mark the location of construction posts. Two fireplace pits can be seen at the center and right of the photo.



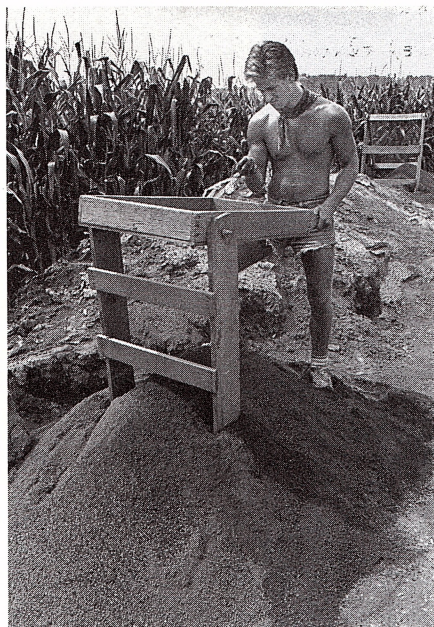
An entire pottery vessel was found broken and buried in the soil at this excavation.

When a site is relatively simple — with only one or two thin layers of occupation — it is possible to separately excavate the remains from each stage of occupation. In such cases it is advantageous to expose large surfaces of the same layer to get an overview of the distribution of features and artifacts at the settlement. Following removal of the top soil, the surface is scraped with trowels or shovels, loose soil is removed and features and artifacts are uncovered. The uncovered surface is then carefully recorded. This might be done with a series of vertical photos.

Horizontal Exposures

The surface should also be recorded in a drawing with each important object numbered individually to record its **provenience** [exact location]. A separate catalog can then be made of all the artifacts, with their inventory number, type of material, kind of artifact, location and layer. The recorded objects are removed one at a time and put in bags with a label showing their number.

Recording Information



Soil from the excavation is put through a screen to recover even the smallest items.



Items are then washed, dried, and put in bags with labels showing their location.

Samples

Excavated soils are usually sifted through screens and/or washed with water to find even the smallest objects, fragments of bone, and plant remains. Different kinds of samples are taken from layers in the walls of the sections and from the occupation floor. Soil samples are taken to help characterize the deposits at the site. Pollen samples are sometimes taken to assist in defining the prehistoric vegetation in and around the site. Samples of charcoal and bone are taken for radiocarbon dating at most sites.

Stratigraphic Sections

After removal of one layer of soil and artifacts in the excavation, the procedure is repeated and a new surface is uncovered and recorded. In order to maintain control of the stratigraphy a number of narrow sections should be left untouched in the excavation area. The walls of these **sections** are cleaned and studied as the excavation continues deeper. This kind of excavation aims at recording and then removing each horizontal layer individually.

Features

Toward the end of the excavation, the sections are removed. The surface of the ground beneath the occupation layer is uncovered and cleaned. Unusual stains or colors in the soil may reveal features such as pits and postholes which are recorded in photos and drawings. Features are dissected by excavating one half of the pit or posthole at a time in order to remove the contents and determine the function of the feature. This produces a vertical section through the middle of the feature.

Sections of all features are recorded in photos, drawings, and soil descriptions. Postholes belonging to the same structure are grouped by examining the depth of the holes and the kind of soil present. Other features are studied in order to determine their function and mutual relationships. Finally, the remaining portions of the features are removed and the excavations are over.



Only one half of a feature is excavated at first. This feature, a house depression, is being excavated with trowels. The small wall in the middle is left as a record of the feature's stratigraphy. Artifacts, bones, and other finds are mapped layer by layer.

End of the Dig

At the completion of the dig, the trenches and horizontal excavations have to be filled up. Undisturbed portions of the site are protected in the best possible way. Records, artifacts, and samples must be shipped back to the home laboratory and prepared for analysis. After the fieldwork is over, the more detailed analyses of the recovered materials, the writing of excavation reports, and the preparation of publications have to be done, all of which requires much more work and time than the excavation itself. One estimate suggests about 5 weeks of analysis and writing for each week of excavation.

Publication

Final results of the investigations are made available to the public and to professional archaeologists through articles in scientific journals and published reports and books. More about analysis and interpretation in archaeological investigations appears in the next chapter.

A Final Note

Historical archives and written records may be studied over and over again, but archaeological sites are a non-renewable resource. Excavations involve moving the earth and all its contents from a site. Every excavation means the destruction of all or part of an archaeological site. One of the advantages of Fugawiland is that you can learn about excavating a site without destroying anything.

All that is left when an excavation is over are the finds themselves, the unexcavated parts of the site, and the photographs, drawings, measurements, and notes that the archaeologists made. Accurate notes and records of the layers, structures, and finds at a site then are absolutely essential, not only for the excavator, but also to create a permanent archive of information about the site that is available to others.



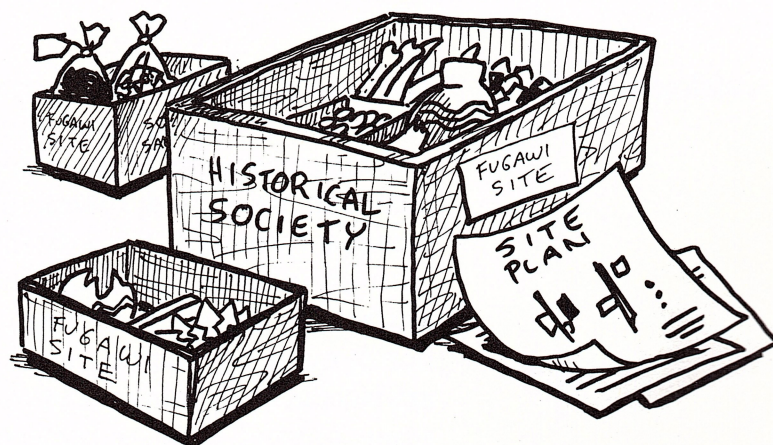
CHAPTER III

ANALYSIS AND INTERPRETATION

When the fieldwork is over, all the materials collected in surveys and excavations must be cleaned, cataloged, counted, classified, and analyzed. Archaeological fieldwork recovers three major categories of materials: (1) **artifacts** — portable objects altered by human behavior, (2) **features** — immovable structures and layers, pits and posts, in the ground, and (3) **ecofacts** — the remains of plants, animals, sediments, and other unaltered materials that accumulate from human activity.

These archaeological materials are defined in terms of their distribution in time and space. Archaeological **dating methods** are used to determine the age of remains in time. Archaeological **spatial analysis** is used to examine the distribution of sites and materials across the landscape. These two approaches are discussed in this chapter.

Archaeological remains are used to investigate past human society. Some of the important questions of relevance to Fugawiland include technology and subsistence, social organization, and ideology. These topics are considered in the last sections of this chapter.



Sorting and cataloging artifacts and other finds from an excavation.



Artifacts

Artifacts are given a number in a catalog of the finds from the excavation. Each object from the excavations must be cleaned by washing to remove dirt. Great care must be taken that these catalog numbers are not lost or removed during the cleaning process. Numbering artifacts with India ink ensures that each has a permanent label with information about the site and location of the find.

Catalog of Finds

The catalog description of each artifact includes a record of the kind of raw material, the color, the overall shape and measurements of the object, techniques of manufacturing, presumed function, decoration, and provenience information. This catalog can be supplemented with an accurate drawing and a photograph of the artifact. An inventory of the materials from the excavation is made by counting and recording the number of artifacts in each category of material, such as chipped stone, ground stone, or pottery.

Following this initial recording, artifacts are classified into other categories and types. **Classification** is a way of creating order in a mass of archaeological materials by grouping items into similar categories for analysis. Classification is the process of dividing objects into groups on the basis of shared characteristics. One example of such classification is the initial division of the remains into artifacts, ecofacts, and features. Another example would be the division of chipped stone artifacts into types of axes, knives, and arrowheads.

Classification

Three primary attributes are used to classify archaeological artifacts: (1) **form** — the basic size and shape of the object, (2) **technology** — the characteristics of raw material and manufacturing technique, and (3) **style** — the color, texture, and decoration of the object. Most of this information is recorded in the laboratory after the artifacts have been cleaned and cataloged.

Artifact Attributes

Features

Features may be structures like houses or pits, or fences or field systems, defining an area used for special purposes, or constructions for certain activities like drying racks, fireplaces, and traps. Features are useful for understanding the distribution and organization of human activities at a site. Features must be studied primarily in the field since they are fixed in the ground. The size, elaboration, and location of houses or burials may suggest differences in wealth and status.

Some features result from the accumulation of garbage and debris, rather than being intentionally constructed. Examples include shell middens [large dumps of shell from mussels, oysters, or other species], heaps of waste material in workshops, and quarries. Studies of such features may provide information on prehistoric strategies for obtaining food or raw material, how the raw material was used and distributed, and whether it was scarce or abundant.

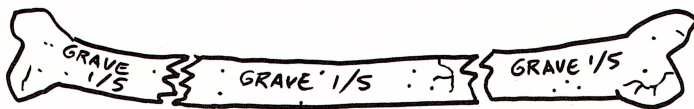
Burials

Burials and human bones are a special category of feature often found at archaeological sites. Several different kinds of burials can be present. Simple **inhumations** represent the laid-out burial of the whole body. Such graves usually contain an "articulated" skeleton, with all the bones in their correct position. Secondary burials are the result of burial of part of the skeleton, after the flesh and soft tissue has disappeared. Usually the skull and larger bones are present, often in a small pile or bundle. **Cremations** are burials of the ash and small carbonized bones from bodies which have been burned prior to burial.

Analysis of Burials

Physical anthropologists are concerned with the identification and analysis of such prehistoric human remains. The sex of skeletons can be determined by examination of the size and shape of the pelvis and the skull and the thickness of the bones. The age at death

can be estimated by the eruption sequence and wear of the teeth, the **fusion** [closing] of sutures between bones of the skull, and the fusion of the ends of the limb bones to the shaft.



Disease and Trauma

The health status of past populations can be investigated by recording the incidence of trauma that effects the skeleton. Such diseases and injuries include bone fractures, arthritis, and periodontal diseases. Nutritional problems may be reflected in poorly developed bones and the low average height of the population. Cultural practices like cranial deformation or dental mutilation, practiced in prehistoric America, also show up in the skeleton remains.

Ecofacts

Ecofacts are unmodified, natural items usually brought to the site by its occupants. Ecofacts, such as animal bones and plant remains, are useful for the study of past human activity, to reconstruct the environment of the site and to determine the kinds of resources that people used. Ecofacts are classified as organic (plants and animal bones) or inorganic (sediments and stone). These materials are usually studied by archaeologists or specialists with training in botany, zoology, or geology.



Plant remains from an archaeological site may include pollen, seeds, leaves, pieces of wood and the like, depending on the quality of preservation. Microscopic **pollen** is usually wind-deposited and may be introduced naturally to the site. Because of its long-range distribution, pollen is more likely to reflect the environment in the general area of the site.

Pollen

Changes in the types of pollen through time at a site can be used to reconstruct the vegetational history of the area and to provide a record of climatic change. Special growing requirements and other characteristics of certain plants may reflect certain climatic conditions or specific local situations like an open or a forested environment around the site.

Macrofossils of botanical materials are visible remains like seeds and plant parts that are more likely to be present at a site due to direct human utilization. Analysis of these remains indicates what species of plants were present, whether they were wild or domestic, and in what context they were found. It is important to study the context of these remains to know how the plants were used. Plants may be collected for food, but they may also be used for production of textiles, mats, and baskets, for making poison for arrowheads, or as drugs. Types of plants and their growing condition may also provide an indicator of the nature of the local environment and climate.

Plant Remains

Animal Bones

Faunal analysis is the term used to describe studies of the animal remains from archaeological sites. Animal remains are tabulated by the kinds of bones and teeth, antler and horn, that is present. Species are identified and the numbers of individuals of each species are calculated. These studies show what animals were hunted and eaten and in what proportion. The amount of meat available from each animal also might be calculated to determine its relative importance in the diet.

Age and Sex Information

Faunal analysis also can provide an estimate of the ratio of adult to juvenile animals and of male to female animals. A predominance of certain age groups in a species such as deer may indicate seasonal or selective hunting was practiced. For example, a site which contained a large proportion of three- to six-month old deer would suggest the animals were killed in the fall since deer are born in the spring.

The presence or absence of certain parts of the animal skeleton may indicate the way animals were butchered and whether the animal was dismembered on the spot or killed elsewhere and selected steaks and chops brought back to the settlement. Not all animals are necessarily hunted for food. Non-food items such as antler, fur, bone, and hides are also important materials from hunted animals.

Soils and Sediments

The most important inorganic ecofacts are the various sediments uncovered by excavation. Deposits of soils and sediments at human settlements result from both human and natural processes. The type of sediments present might indicate the source of the material that is deposited. Examples might include water-laid silts from a flood, volcanic ashes, or frost cracked rocks from the ceiling of a cave. Soil chemistry is an important part of the analysis of archaeological sites.



Archaeological Dating

It is always important to know the age of a prehistoric site. Archaeologists distinguish between relative and absolute dates. **Relative** dates evaluate the age of an object in relation to other objects. For example, A is older than B. **Absolute** dating methods are used to assign a specific, calendar age to an object, say 2650 B.C. or A.D. 220. Age determinations may be direct or indirect. Some dating techniques measure the age of the artifact, ecofact or feature itself (directly), while other items are dated indirectly by their association with material of known age.

Stratigraphic sequences provide a relative chronology, a document showing that lower layers and their contents are older than higher ones. A deeply stratified deposit may allow the archaeologist to determine the temporal sequence for a number of different levels. A relative chronology makes it possible to study changes in the artifacts through time and observe temporal trends in variation. Ordering artifacts in a relative chronology is a big step towards establishing a temporal framework. However, a relative chronology does not provide the actual age for an object and it cannot tell us how many actual calendar years are involved.

Dating in calendar years [**absolute chronology**] is possible if artifacts can be related to historical events. For example, a coin which shows the face of a certain king or with an inscribed date found inside a house provides a maximum date for the house. However, a large part of the archaeological record predates any historical records or coins, and cannot be dated by such information.

One of the best methods for determining the actual age of prehistoric materials is **radiocarbon dating**, based on the principle of radioactive decay. Unstable radioactive isotopes in various materials change into stable isotopes over a certain amount of time.

Kinds of Dates

Stratigraphic Dating

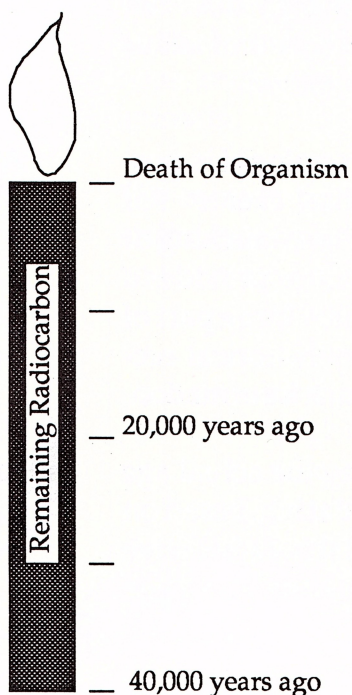
Absolute Dates

Radiocarbon

In the case of radiocarbon, the unstable, radioactive isotope of carbon (carbon-14 or ^{14}C) is produced in the atmosphere as a result of cosmic radiation. These very small quantities of ^{14}C are distributed evenly in the atmosphere and combine with oxygen, in the same way as normal carbon (^{12}C), to form carbon dioxide.

All living things absorb both stable carbon (primarily ^{12}C) and the radioactive isotope (^{14}C) throughout their lifetime. Plants incorporate carbon dioxide through photosynthesis and animals eat plants or other animals. The proportion of ^{12}C and ^{14}C remains constant in an organism, as in the atmosphere, until its death when the intake of new carbon stops.

Following the death of the organism, radioactive carbon begins to decay and the ratio of ^{14}C to ^{12}C begins to decrease at a constant rate. The radiocarbon rate of decay is expressed in a half-life of about 5,568 years. This means that a sample which contained 15 milligrams of ^{14}C when alive has only 7.5 milligrams after a period of 5,568 years after its death; after 11,136 years (2 times 5,568) only 3.75 milligrams remain, and so on.



Radioactive carbon is a bit like a large candle that starts burning when an organism dies. Since the candle burns at a constant rate, it's possible to tell how long it has been burning. The older the organism, the smaller the candle that remains. After about 40,000 years there is not enough flame left to be seen. Thus the amount of ^{14}C left in ancient plant or animal remains may be used to determine the time elapsed since death. The difference between the original amount of ^{14}C and the present amount is used to calculate the age of the sample in calendar years.

Archaeological Spatial Analysis

Archaeological spatial analysis is the term used to describe the study of how and why prehistoric remains are distributed across the landscape. This involves investigations ranging from the location of different activities within a single room to the distribution of sites in a large region. Usually three levels of spatial distributions are studied: (1) a single structure or occupation surface like a cave floor, (2) a site or settlement, or (3) a series of sites within a larger region.

The spatial organization within a single structure reflects the use of areas for special activities such as grinding flour, cooking, weaving, tool manufacturing, or for certain facilities such as sleeping areas or storage. Studies of such patterns may indicate a division of male and female space and activities, how many people lived in a household, and the structure of the family — nuclear, extended, or polygynous.

Structures

A **settlement** generally includes a habitation area with one or more houses and fire places, different activity areas for things like food preparation, the curing of animal skins and hides, the manufacture of various artifacts, perhaps storage equipment, and a midden or trash area. Spatial patterning within a site can provide information about the number of houses and people at the settlement and on their relationships with one another. In addition, most of the day-to-day activities of the occupants should be reflected in the various structures and activity areas found throughout the settlement. Structures at a site may be solid and substantial in case of permanently settled communities in a village or town-like setting. Short-term or seasonal settlements, however, may leave little trace of construction.

Settlements

The size of a settlement in horizontal and vertical extent depends on the number of people living there, the duration of occupation, the kinds of activities and structures that were erected, as well as environmental factors. Sites of the same size could have been created by a few permanently settled people or through the occasional use of the same spot by a larger group of people.

Differences in the size and architectural elaboration of houses may be evidence of status differentiation, a situation where some people have more wealth and control over goods and labor than others. The arrangement of houses at a settlement also may reflect social organization in the separation of poor and wealthy households. Concerns for privacy and protection in the form of fences, palisades, or even ditches may indicate private ownership or conditions of competition or warfare. Settlement studies also may reveal areas of economic specialization with skilled craftsmen involved in the production of certain materials, while other items are made in individual households.

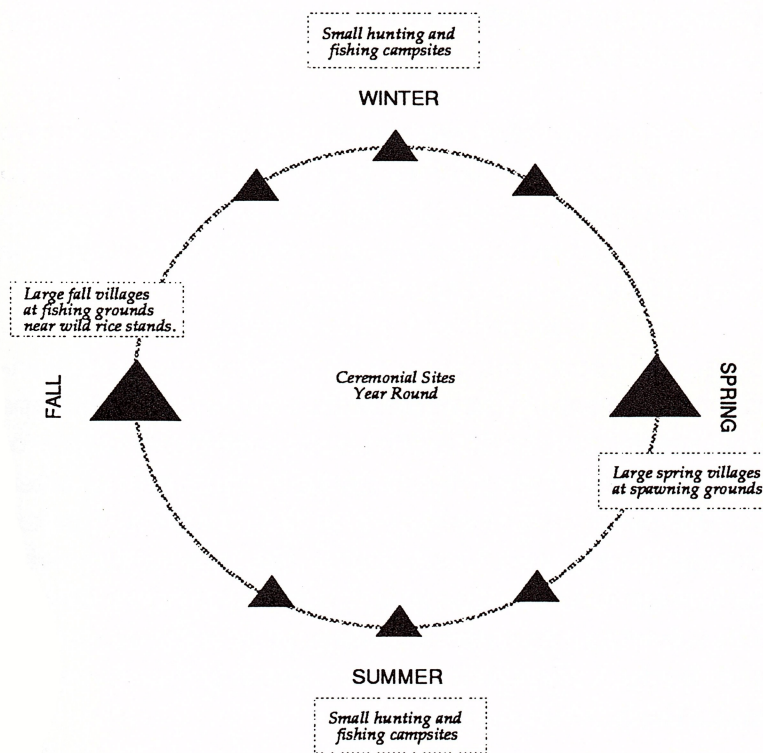
Regions

Regional settlement patterns can provide a variety of information. Several different kinds of sites often are found in an area. Residential **settlements** of various size and duration are typical targets for investigation. Such sites can vary from camps, to villages, towns or prehistoric cities.

Other kinds of locations — **extraction sites** — are used for more specific, non-residential, purposes to obtain raw materials or resources, like quarries for obsidian or copper or places where animals were killed and butchered. Distinct burial areas, outside of settlements, are another kind of site. Cemeteries of inhumation graves, cremation urns, or individual burial mounds and tombs are some other types of sites that occur. A large proportion of archaeological finds are single items found out of context with anything else. These **stray finds** are things that were simply lost or else represent the remains of sites destroyed beyond recognition.

Different types of sites are often related to one another. One example of this kind of pattern is found among many hunter-gatherer societies. Such people, like the Eskimo or Australian Aborigines, until recently followed a regular, seasonal pattern of changes in subsistence and settlement moves. Groups move their residence to be near food resources that are abundant in specific places at certain times of the year.

Annual Cycle



An Example of Annual Cycle

Such a pattern is known as an **annual cycle** or seasonal round. One kind of site in such a seasonal settlement pattern might be a fishing camp near a lakeshore in the springtime. This kind of annual settlement round may be present in Fugawiland as well. This is one of the questions you should examine when you begin your study in the next chapter.

Exchange

One way to study interaction within and between societies is to look at the distribution of items of exchange. When artifacts such as stone axes, obsidian knives, metal spearpoints, or certain kinds of food have passed from person to person, archaeologists talk about "exchange." Economic anthropologists distinguish three different kinds of exchange: reciprocity, redistribution, and trade.

Reciprocal exchange usually takes the form of gift-giving, where objects of relatively equal value are given to build alliances.

Redistribution involves the movement of goods to a central place from which they are portioned out to members of the society. Such a system of redistribution might be used to support an army, or craftsmen, or the pyramid builders in ancient Egypt.

Large scale economic transactions known as **trade** usually involve some sort of market economy, and perhaps a monetary standard. Trade takes place in our own economic system where objects are imported and exported for the purpose of making a profit. This level of exchange usually involves a highly complex society with professional artisans, regular supplies of raw material, extensive transportation systems, protection of markets and traders against theft, and enough customers to make the business worthwhile.

Exotic Materials

Archaeologists often examine exchange and interaction through the study of "**exotic materials**." The presence of objects and materials that are not available or locally produced in the study area provides immediate evidence of connections and interaction with others. Of greatest use in such investigations are artifacts or materials which come from a single source. Examples of such single source materials are also to be found in Fugawiland in the form of copper and obsidian. These are important raw materials from the manufacture of knives and other tools.

The three types of exchange (reciprocity, redistribution, and trade) result in different distributions of the exchanged objects at archaeological sites. One pattern of distribution may show a gradual decline in the abundance of the object from its source. Such a pattern might reflect reciprocal exchange between equals. Objects might have moved from person to person as gifts, eventually travelling long distances without the individuals themselves ever going very far.

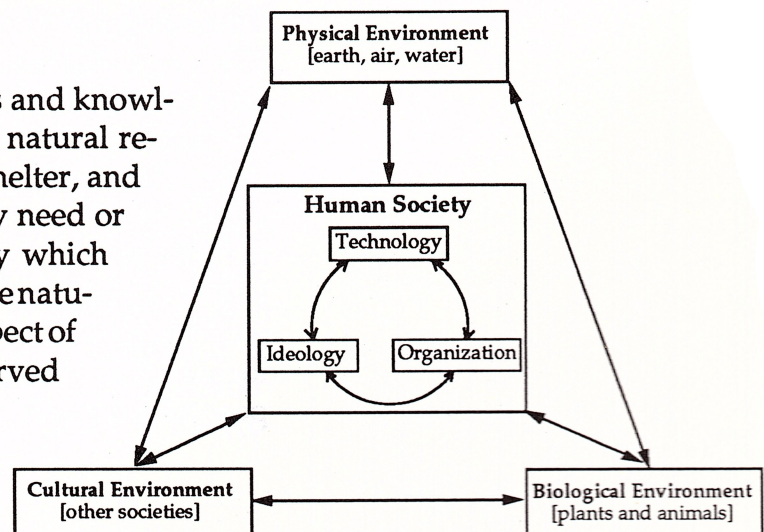
In some cases, the spread of objects may drop dramatically or stop all together at boundaries between groups separated by culture, language, or ethnicity. This break in the distribution may reflect a break in the social relations and interaction involved in the exchange. Such a situation may also be the case in Fugawiland and one focus of your study.

Investigating Past Societies

The major goals of archaeology are to reconstruct past human behavior and to understand the operation of human societies in general. The archaeologist infers how past societies functioned by investigating the evidence from artifacts, ecofacts, and features. This same set of basic information can be considered in very different ways depending upon the questions one asks. The kinds of questions archaeologists ask about past societies generally involve technology and subsistence, social organization, and ideology.

Technology is the set of techniques and knowledge that allows people to convert natural resources into tools, food, clothing, shelter, and other products and equipment they need or want. Technology is the means by which people interact most directly with the natural environment and it is also the aspect of past culture that is most easily observed in the archaeological data.

Goals of Archaeology



Subsistence refers to the activities and materials that people use to feed and shelter themselves. Archaeologists use the term subsistence pattern to describe the plants and animals that prehistoric people ate, the activities required to obtain those foods, and the preparation techniques and equipment used to turn those plants and animals into food. The term hunting and gathering describes one such pattern in which wild animals were hunted and wild plants were collected or gathered for subsistence. Hunting and gathering contrasts with farming, which refers to use of domesticated plants and animals for the *production* of food.

Social organization refers to the roles and relationships in society, and includes relations between women and men and between different age groups. Kinship and marriage systems, political hierarchies, and trade and exchange network are important aspects of such organization.

Ideology is the means by which people structure their ideas about the order of the universe, their own place in that universe, and their relationships with one another and with other things and beings around them. Ideology encompasses the norms, values, and beliefs held by a society. Religious beliefs, art styles, symbols, and cosmologies are examples of ideological expressions.

These aspects of human society — technology and subsistence, social organization, and ideology — are closely interrelated in prehistoric materials. The same artifact or object may contain information on each of these aspects. For example, a certain type of knife found exclusively in women's graves holds information on the manufacture of tools, on the nature of women's work and the distinction between sexes in the society, and on ideas about death. Technology, social organization, and ideology are thus different, but related, dimensions of past cultures and of human life.

PART THREE

ADVENTURES IN FUGAWILAND

By now we hope you are impatient to begin. This part of the workbook is intended to lead you through the computer part of the Fugawiland. **Be sure to look at Part IV as well before you begin the computer simulation.** You will need to write down information you get from the computer in the Report of Investigations in Part IV.

Turn on the computer and make sure that the operating instructions [DOS] are running things. Now take the Fugawiland computer disk that comes with this workbook and put it in your computer (or use an alternate method according to your instructor). All you need to do is type FUGAWI and press the Return Key to get the program started.

You should quickly see the name Fugawiland and other information. From this point you will receive detailed directions on the screen. Following the path through Fugawiland is simple and requires only pressing a few keys on the computer keyboard. If you don't get the first screen for Fugawiland immediately, try typing A:FUGAWI and the Return Key. If that doesn't work, ask the instructor or computer consultant for help.

There are several features of Fugawiland that will help you understand the assignment. Keywords and things to do are shown in **bold**. Many keywords also are defined in the glossary at the back of the workbook. Information can be found in the help option of the computer program about maps, artifacts, food sources, site analysis, and many other things. You should make use of this help feature frequently to learn more about the environment of Fugawiland and about the sites themselves. There is also an analysis section which will allow you to sort through the information you have excavated or look at graphs of one or two categories of information. These features are explained in more detail in the following pages.

Turn on Fugawiland

Features

Stopping and Starting

The computer part of Fugawiland may take up to two hours for you to complete. You can stop in the middle and return to the assignment at a later time. Just follow the steps indicated on the computer to stop and resume. Remember to enter your name and I.D. number exactly the same way each time you restart.

Testing

Fugawiland includes a section of objective testing with ten multiple choice questions. Note that you can look at, answer, or change your answer to any of these questions at any time. You may want to study the questions before you begin to help decide which sites to select for excavation. Whenever you are ready to answer a question, please enter your answer as directed.

When you have completed your excavations, remember to review and answer all ten questions. The computer will print out an answer sheet when you are finished. This answer sheet should then be given to your instructor. **Be sure that a printer is connected to your computer and turned on before you ask for the printed answers.**

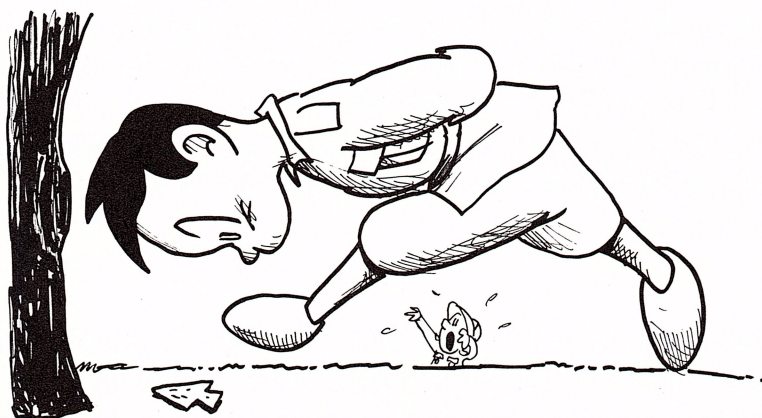
Analysis

Your analysis and interpretation of the prehistoric sites and activities in Fugawiland is the focus of this exercise. You will be asked to write a summary of your study in the chapter titled Report of Investigations. You should include in this report some information on how you arrived at your conclusions about the prehistory of Fugawiland. This summary should discuss the differences and similarities you found between sites and what those might mean. The workbook also contains several chapters you can use to increase your understanding of Fugawiland and to record and evaluate the information collected in your investigations.

Remember that Fugawiland is a fictional simulation, an imaginary situation, that contains more detailed information than is generally available in actual archaeological investigations. For example, there is no obsidian in northeastern Wisconsin; the sites described in this area have not yet been discovered. Nevertheless, Fugawiland is a useful example of the kinds of questions that archaeologists ask and of the kinds of information that can be used to answer those questions.

After a few pages of information on the computer screen, you will see a map with the location of 25 archaeological sites in a fictional part of the state of Wisconsin. You can excavate 10 of these sites. Your choices of which sites to excavate are important. "Excavation" will reveal the plan of the site on the computer screen, along with the distribution of artifacts, houses, hearths, and burials. Through the study of the excavated sites and their contents, patterns may emerge that provide information on prehistoric diet, settlement, season of occupation, population, land use, and group affiliation.

Excavating



Fugawiland

- 0 -- Exit
- 1 -- About Fugawiland
- 2 -- How to use the computer
- 3 -- Multiple choice questions
- 4 -- Map of Fugawiland
- 5 -- Site excavation
- 6 -- Site plans
- 7 -- Analysis of data
- 8 -- Help

Main Menu Options

Fugawiland is designed so that you can move through the computer program without difficulty. This is done, not with mirrors, but with what are called **menus** in computer lingo. The Main Menu for Fugawiland is in the margin next to this paragraph. Other menus from Fugawiland appear in the following pages of this workbook. You can select any item on the menu with the space bar or the backspace key, or you can simply press the number key corresponding to the item you want. Then press the return key to go into that section. You can move from any part of the assignment to any other and back again without restriction using the menus in Fugawiland.

The Main Menu for Fugawiland is explained briefly below and in more detail in Part Two of the workbook. In fact, this part of the workbook follows the Main Menu of Fugawiland so that you can use the two together. Menu options are shown in capital letters in the paragraphs below and throughout this workbook.

ABOUT FUGAWILAND — Fugawiland opens with a series of instructions that describe the program and a set of options in a menu that provide an immediate view of what is included. Much of what is found in this section on the computer is also in Chapter IV of this workbook as a description of the problem and the concept of Fugawiland.

HOW TO USE THE COMPUTER — This section is for you if you are not familiar with the basics of the personal computer. Please be sure to read Chapter V in the workbook and look at this part of the program if you don't know how to use the return key, the spacebar, the escape key, and the number keys.

HELP — The Help Section contains information for you as an archaeologist. It provides details on terms that are used, and about different kinds of artifacts, features of the landscape, and how archaeologists analyze the information they collect. The Help Section can be reached from almost any Menu in Fugawiland.

MAP OF FUGAWILAND — This provides a map of Fugawiland with the location of twenty-five known sites in the area. The map also shows the Lake Michigan shoreline, the Pickering River, the western hills, and the sources of copper and obsidian in Fugawiland.

EXCAVATING SITES — In this part of the program you select and excavate ten sites. Excavations are shown on the computer as a map of the artifacts and features at the site. This section will also provide a summary of the contents of the site showing all of the different materials found there.

SITE PLANS — This section produces the excavation maps of the different sites you have selected to excavate. In most cases the excavations uncovered all of the prehistoric site. Each map is a bird's eye view of the area that was excavated and the evidence that was found. The scale of the map is the same for all the sites so you can compare the size and distribution of materials immediately.

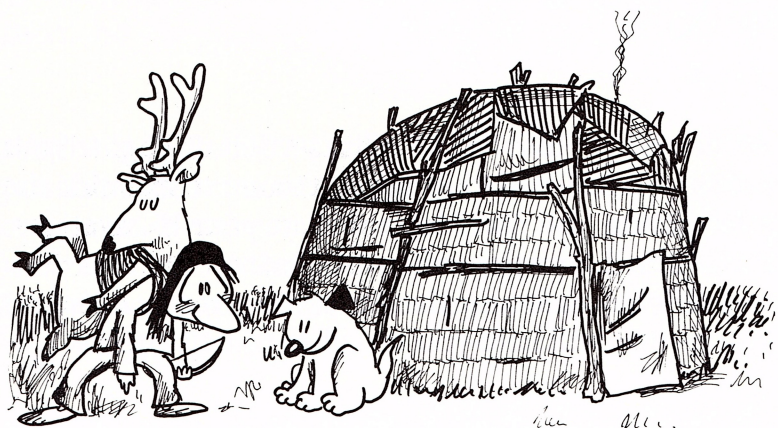
ANALYSIS OF DATA — This section of Fugawiland provides a series of tools for you to use to examine the information you have obtained in your excavations. Options in this section can be used to sort out similarities and differences among the sites and to create tables and graphs that will help you visualize these patterns.

MULTIPLE CHOICE QUESTIONS — You will be asked to answer ten multiple choice questions, based on your investigations in Fugawiland. These ten questions are chosen by the computer specifically for you from a larger set. Each student has a different set of questions to study and answer. Just as in real archaeological studies, the questions of interest determine the direction of the research.

Selecting the multiple choice section from the main menu will let you look immediately at the ten questions you will be given in Fugawiland. You can return to this section at any time in the course of the assignment to answer or review the questions. You will need to answer all ten questions before you complete Fugawiland, but you can change your answers before you exit for the last time.

EXIT — Fugawiland gives you the option to leave the assignment at any point, and return at a later time to continue where you stopped your investigations. This same option will allow you to re-enter Fugawiland if an error occurs while you are using the program.

In order to use this option, it is important to type your name and student identification number correctly at the start of each Fugawiland session. If you are using the Fugawiland disk, it is important to use the same disk each time. If you have any questions or problems, please see your instructor.



CHAPTER IV

ABOUT FUGAWILAND

About five thousand years ago, several groups of people lived in northern Wisconsin in an area known as Fugawiland. This was an area of warm summers and very cold winters. Snow and ice would have covered the land and water during the winter.

These people were hunters and gatherers, unaware of the potential of domesticated sources of food. Fugawiland was rich in plant and animal life. Deer, rabbits, fish, mussels, acorns, and a variety of berries, roots, and other plants provided a good diet for the people. Stone, copper, obsidian, shell, and antler was available for making tools and other equipment.

A number of the sites from this time period have been identified from artifacts on the surface of the ground. A map of Fugawiland and the location of the known sites is available. Sites in Fugawiland are found along the lakeshore, the river, in the western hills, or in the plain.

The people of Fugawiland apparently enjoyed a very successful lifestyle for many years but we know little about them other than the age of the sites, the kind of foods available, and the tools they used. To better understand these settlements and the people who lived there, new excavations are essential. There are many things we would like to know.

As an aspiring archaeologist you have the time and money to excavate ten sites to learn more about how these people lived. You have to decide which sites you wish to excavate. Your excavations may reveal houses, graves, fireplaces, and artifacts that have been buried in the ground. Study the location of the sites before you begin to excavate.

You may then analyze the information from the sites that you have excavated to learn about the people of Fugawiland. You will learn more about how to analyze the information from these sites later.

Questions About Fugawiland

First we will need to establish some basic information about how these people lived. Questions about what they ate, about the length of time and the season of the year they lived at these sites, and about the number of people who lived there, may help you better examine the Fugawi adaptation.

Some of the more detailed and specific questions that archaeologists might ask about the people and artifacts from Fugawiland are listed below. Questions like these should guide your travels through Fugawiland.

1. How many different kinds of sites are there?
2. Were any of the sites occupied for the entire year?
3. Were sites with lots of arrowheads used in spring?
4. Where were people usually buried?
5. Did everyone have obsidian knives to use?
6. Were fish eaten at the inland sites?
7. How many groups of people lived in the area?
8. Are there any special, ceremonial sites in the area?
9. Was copper available to everyone in Fugawiland?
10. Are river mussels and deer eaten at the same sites?

Help

Assistance in finding answers to these questions can be found in the Help Section of this workbook, in the computer program, and in your own thoughts and common sense about the differences you see in the information that you collect. One way to consider this problem is in terms of your own life and the places you live. How many different places are important in your life (home, church, summer cottage, school) and what distinguishes each? What kinds of equipment and furniture are characteristic of each? How many people are together at each place? Just take these questions back in time to try and understand how the prehistoric people of Fugawiland may have lived.

CHAPTER V

USING THE COMPUTER

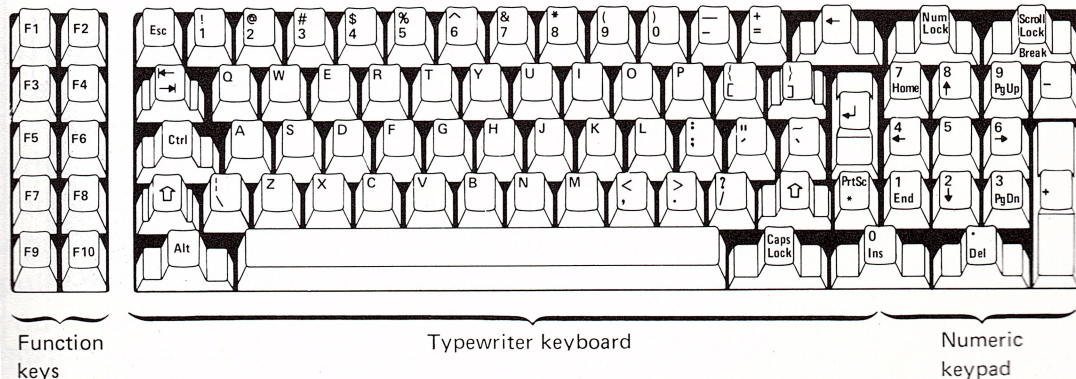
This section of Fugawiland provides some details about how to use a personal computer. If you are familiar with computers, you can skip this section; push the Escape button and go back to the Main Menu. If you would like to know more about the basics of using a computer there is a large section in the computer program called Using the Computer that may be of interest.

Computers are pretty stupid actually, always waiting for you to tell them what to do. Essentially all you need to do is look carefully at the computer keyboard, which is like a large typewriter, locate the important keys shown here, and begin your travels through Fugawiland.

Fugawiland is intended to be used on IBM and compatible computers. The IBM keyboard has about 72 keys, only some of which you need to use in Fugawiland. The Space Bar is the long key at the bottom of the keyboard. Fugawiland moves to the next screen, or page, of information each time you press the Space Bar. Another important button is the Return key, similar to the carriage return on a typewriter. The Return key signals the end of your message and is used often in Fugawiland.

Important Keys

Return [Enter]
Backspace [arrow]
Esc[ape]



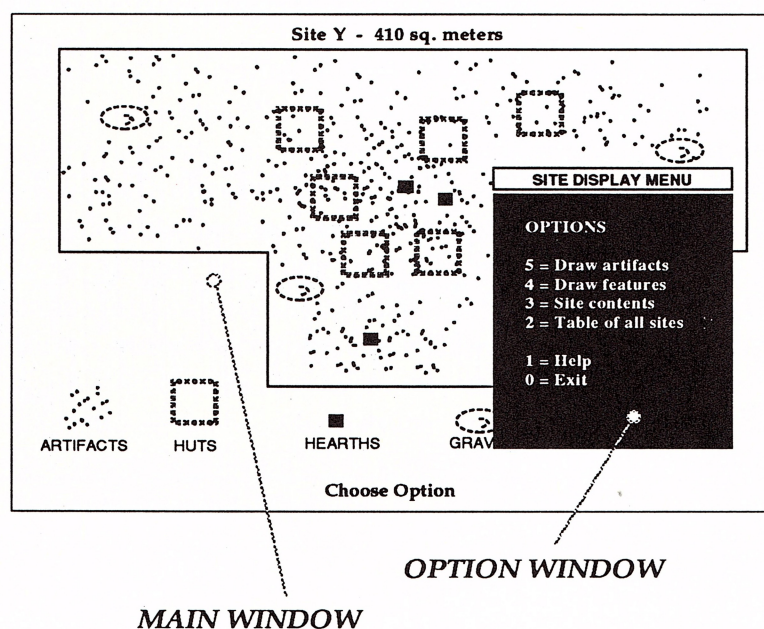
Fugawiland sometimes asks you to press a letter or number key, which can be found at their standard typewriter locations on the keyboard. The Escape key is also important and allows you to move quickly from one part of Fugawiland to another, usually back to the Main Menu.

Windows and Screens

The keyboard is pretty straightforward. Now let's look at the way Fugawiland displays information on the computer screen. Each screen or display is a window on Fugawiland; often more than one window can be displayed at a time. For example, the main window displays the basic information about Fugawiland, either words or pictures — for example, a map of the area.

Menu Windows

Menu windows can appear on top of the Main screen or window to indicate some of the choices or options you have in travelling through Fugawiland. To select an option in the Menu Window simply press the appropriate number and the return key. These options allow you to move around quickly and freely in Fugawiland to conduct excavations, to view maps, or to analyze the information you have collected. After a few minutes in Fugawiland, the use of these keys and windows becomes almost automatic and you can travel more quickly.



CHAPTER VI

HELP

The Help Sections of the Fugawiland program contain useful information that you as an archaeologist should know. They provide definitions and details about terms, concepts, artifacts, features of the landscape, and how archaeologists analyze their data. The Help Sections can be reached from almost any part of Fugawiland by using the Menus.

The Help Menu is reproduced in the margin. Specific information on each topic can be selected by moving to the appropriate number and pressing the return key. Much of the help information in Fugawiland may also be found in the following pages of this book. The Exit option in the Help Menu returns you to the Main Menu.

Printout Option

A printout of maps, sites, or any computer screen can be made at any time by simply following the steps below:

- (1) make sure a printer is connected and turned on.
- (2) hold down the <SHIFT> key.
- (3) press the <PrtSc> key on the right side of the keyboard.

WARNING! It is important that you make sure that a printer is properly connected to your computer, that it is turned on, and set to print from YOUR computer. Otherwise an error may occur, and you might be thrown out of Fugawiland. If your computer is not connected to a printer, exit Fugawiland and take the disk to a computer with a printer before you finish the program. If you have any questions, please ask your instructor or the computer attendant before you begin to print.



Help Menu

- 0 -- Exit help section
- 1 -- How to make printouts
- 2 -- Fugawiland
- 3 -- Excavation
- 4 -- The archaeological site
- 5 -- Site artifacts
- 6 -- Site features
- 7 -- How to analyze data

CHAPTER VII

MAP OF FUGAWILAND

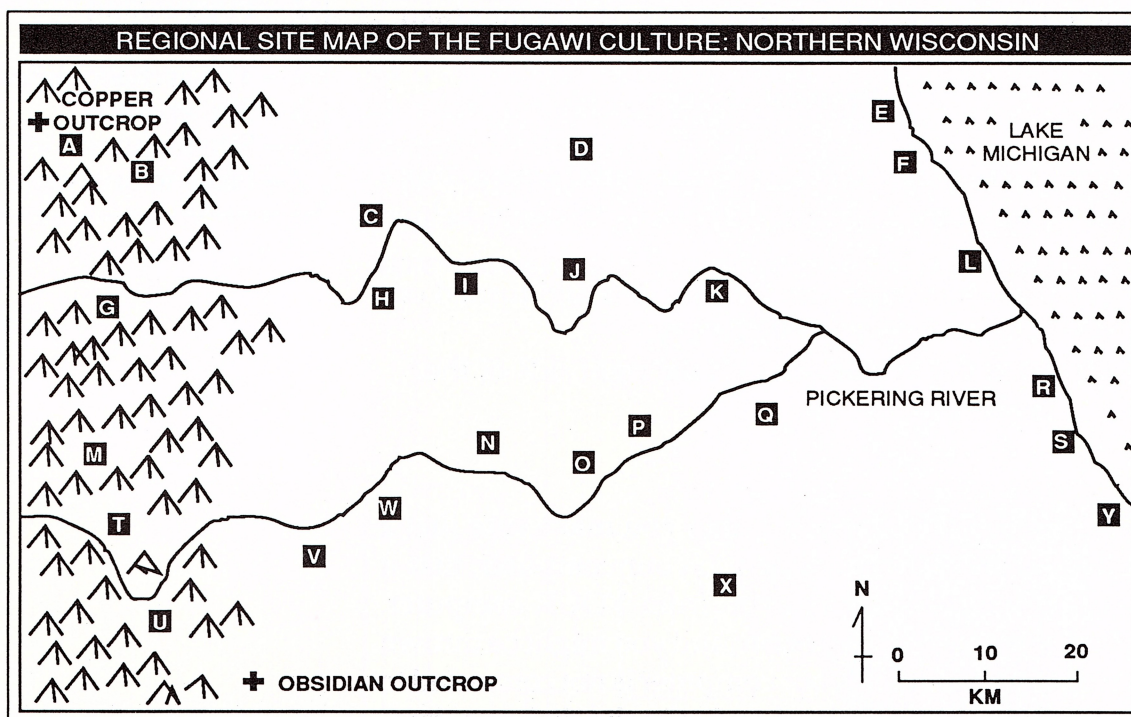
Map Menu

- 5= Add sites
- 4= Add shoreline
- 3= Add rivers
- 2= Add hills

- 1= Help
- 0= Exit

After you select the map of Fugawiland, press the space bar to look at the option menu. Almost all parts of Fugawiland have an Option Menu window that you can see by pressing the space bar. The options in the Map of Fugawiland section permit you to see the location of the sites in Fugawiland and the surrounding landscape.

The map shows an area that is approximately 9,600 square kilometers, roughly 80 kilometers north-to-south and 120 kilometers east-to-west. In miles, that's about 50 by 80, the size of a very large county or a very small state.



Fugawiland lies on the western shore of Lake Michigan, where fish, mussels, and bird life may have provided important sources of food. The level plains were grass covered with few trees and were likely the home of abundant deer and small mammals. The rivers that run east-west across the plains to the shore would have been important sources for both food and water.

These river and stream valleys likely would have been heavily wooded during the time of the prehistoric occupation of Fugawiland. The hills in the west of the region are rolling and forested with oaks. Deer would have been particularly numerous in these hills. Acorns would have been everywhere in the hills in the autumn.

Copper occasionally is found as a natural metal in the Great Lakes region. This "native copper" can be cold hammered into tools of a variety of shapes and sizes. In Fugawiland, this native copper is only found in a small stream bed in the northwestern part of the area. We can safely assume that all the copper artifacts in Fugawiland were made of material from this source.

Copper

Obsidian is a black, glass-like material created from molten sand in volcanic eruptions. Obsidian was used to make stone tools with very sharp edges that were easy to manufacture and was highly prized in prehistoric times. In Fugawiland, there is only one known source for obsidian, located in the hills in the southwestern part of the area. This source was almost certainly the location from which all the obsidian in Fugawiland came.

Obsidian

CHAPTER VIII

EXCAVATING SITES

After you add the landscape features to Fugawiland, you will see a map of the area showing the lakeshore, river, hills, sites, and sources of copper and obsidian. From the information on this map you should **select the ten sites** you wish to excavate.

Intuitive Sampling

There are two ways to select which sites to excavate and you can use either one you choose. One is simply **intuitive**, deciding what combination of sites will best represent the entire study area. In this manner, one would usually select sites in different parts of Fugawiland in order to be sure of getting as many kinds of sites as possible. **If you want to intuitively select which sites to excavate, circle your choices on the map in Part Four and check the box marked intuitive.**

Random Sampling

A second way to select sites is known as **random sampling**. This is a simple procedure through which the ten sites are selected at random rather than based on any previous ideas about the area. Such a method should insure that personal preferences do not affect the selection of sites.



Statisticians tell us that we should use tables of random numbers to guarantee that there is no bias in the selection process. Such a table appears in the margin. **Simply close your eyes and put your finger on the table for a place to start. Use a pen or pencil to circle ten consecutive pairs of numbers in the table of random numbers. If any of the numbers are duplicates, continue circling pairs until you have ten different numbers.**

Next use the table of site letters and corresponding random numbers to determine the appropriate sites for the numbers you have selected. **Circle the site numbers you have selected.** These are the sites you should excavate if you chose the random sampling method.

Circle the sites you have chosen on the map in Part IV, Report of Investigations, to keep a record of your selections. At the bottom of the map indicate whether you used intuition or random numbers to select sites for excavation.

Excavation Option Menu

The Excavation Option Menu will permit you to excavate and study the sites you have selected. You will first see the map of Fugawiland with 25 sites, the lake, the river, and hills. You must press the space bar to get the Option Menu for Excavation.

In order to excavate ten sites in Fugawiland, all you have to do is indicate your choices when prompted by the computer. The computer will excavate each site you select and report back to you on what was found. A map of the sites that you have excavated is also available. Follow the menu options to excavate a total of ten sites in Fugawiland.

Table of
Random Numbers

20	15	01	24	08	23	02	04	10	08
18	10	21	13	14	16	03	23	05	10
03	22	11	14	05	17	01	16	17	19
08	24	12	21	05	13	11	08	19	22
12	11	01	23	04	13	04	11	25	01
08	15	07	09	25	20	24	07	06	20
10	03	07	06	17	14	23	01	04	06
21	09	24	10	09	18	23	08	25	22
21	15	25	19	16	11	12	25	18	02
07	18	12	07	05	17	19	22	03	16
09	22	20	06	05	24	20	17	02	15

Circle the ten random numbers and corresponding sites that you have selected

01 A	14 N
02 B	15 O
03 C	16 P
04 D	17 Q
05 E	18 R
06 F	19 S
07 G	20 T
08 H	21 U
09 I	22 V
10 J	23 W
11 K	24 X
12 L	25 Y
13 M	

Excavation Menu

5= Excavate a site
4= Map excavated sites
3= List excavated sites
2= Printout of site map

1= Help
0= Exit

Menu Options

EXCAVATE A SITE — this option will allow you to choose a site for excavation. Remember, you can only excavate a total of ten sites. The computer will draw a circle around the sites you have chosen for excavation.

MAP EXCAVATED SITES — this option will show you which sites you've excavated so far by blinking the excavated site letters on the map of Fugawiland.

LIST EXCAVATED SITES — this option will show you a table of the sites excavated so far and other information such as location (with coordinates) and elevation.

PRINTOUT OF MAP — allows you to print the map of Fugawiland with the sites that you have already excavated.

HELP — takes you to the Help Menu for additional information.

EXIT — returns you to the Main Menu.

Think about the information you obtain in your excavations. You should consider the kinds and amounts of artifacts and features present at each site, as well as what items are absent. The sections Site Display and Analysis will allow you to revisit and re-examine the excavated sites and their contents anytime you wish.



CHAPTER IX

SITE PLANS

This section of Fugawiland provides a view of each site you have excavated and shows what was found. The Site Plans Menu allows you to study the excavation maps of the site you selected. The first thing you see in this section is an outline of the excavation area for the site. The boundaries of the excavations are indicated by the solid lines around the site. In most cases the excavations uncovered all of the prehistoric site.

Site Plans Options Menu

Use the space bar to open the Options Menu to look at the artifacts and features at the site. Each of the options provides different information on the excavated site. The menu appears in the margin and the options are described below.

DRAW ARTIFACTS — this option will draw the artifacts that were found as small dots on the excavation map. All kinds of artifacts appear as a simple dot on the map. You will have to look at the site contents to see the different kinds and amounts of artifacts at the sites.

DRAW FEATURES — this option will draw all the different types of features (houses, hearths, graves) on the excavation map.

SITE CONTENTS — displays the kind and number of different artifacts found at the site for you. These artifacts are shown on the next page.

Site Plans Menu

7= Draw artifacts
6= Draw features
5= Site contents
4= Table of all sites

3= Map of Fugawiland
2= Display another site

1= Help
0= Exit

SITE CONTENTS			
			
ROUND HUTS: 5	POINTS: 51	DEER BONES: 210	ACORNS: 1200
			
HEARTHS: 11	COPPER BLADES: 50	RABBIT BONES: 110	SHELLS: 20
			
GRAVES: 5	SHELL PENDANTS: 22	FISH BONES: 100	ZZ POT SHERDS: 60

TABLE OF ALL SITES — this option will provide a table of all the sites you have excavated and information on their location, their elevation, size, and contents.

MAP OF FUGAWILAND — takes you back to the Map of Fugawiland and highlights the sites that have already been excavated.

DISPLAY ANOTHER SITE — this option allows you to look at sites that have been excavated while you are in the Site Plan section of Fugawiland.

HELP— takes you to the Help screens for more information.

EXIT— returns you to the Main Menu.

There are several things to be seen on the excavation maps and plans. Artifacts, bones, shells, and plant remains are shown as simple dots on the map. You should notice if some areas or sites have heavier concentrations of artifacts than others. The scale of the map is the same for all the sites so you can directly compare the size and distribution of materials in the excavations.

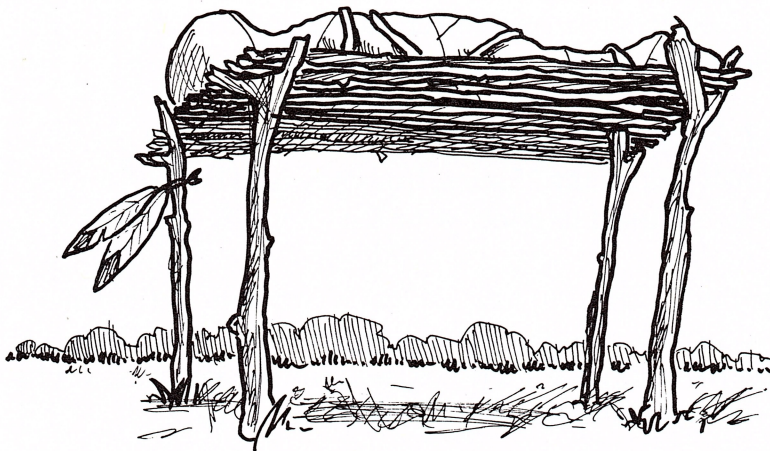
Site Plans

The remains of houses, fireplaces, and graves are also shown on the plans. Houses are indicated by a circular or square line. In some cases these lines are double indicating that heavier construction was used at a particular site. Hearths are shown as shaded, square areas. Hearths may occur inside or outside houses. Both small and large hearths are known from sites in Fugawiland.

Features

Graves are indicated by an oval with a stick figure or crescent inside to indicate the two types in Fugawiland: extended and bundle burials. There probably were also scaffold burials at high points on the landscape, but traces of such structures are difficult to discover archaeologically.

Types of Graves



The presence of certain materials may tell you about the time of year the site was occupied or the type of activity taking place. Other objects or structures may reflect the gender of the individuals using them or perhaps how many people were present.

There is a table called "Finds from Fugawiland" in Part IV, Report of Investigations, for you to fill in as you excavate. Write in the spaces provided the site designation, elevation, size, and contents to keep a personal record of your investigations. There is also a space for notes about each site so you can record any special aspects of the site that you see.

Site Characteristics

In addition to the map and site plans, there is another important source of information about the sites you have excavated. The on-screen **Table of All Sites** contains a summary of all information from the sites you have excavated. This table is also used in the Analysis Section. These site **characteristics** and **contents** are described below in the order they appear in the Table of Site Contents available on the computer.

Site Designation: This is simply the letter used to distinguish each of the 25 sites, from A to Y. These are the letters you used to select your ten sites.

Setting: This term refers to the location of the site in the landscape, whether coastal, riverine, hills, or plain. An abbreviation is sometimes used for these features. H = hills, S = shoreline, R = river, and P = plain.

Coordinates: These values indicate the distances north and west where the sites occur on a standard grid for the area. Higher values indicate that a site is more to the north and/or west.

Elevation: Elevation is the altitude of a site above sea level. The greater the elevation, the higher the site in Fugawiland. Elevations are greater in Fugawiland as you move from east to west, from the shore of Lake Michigan to the hills of the western part of the region.

Site Size: This is a measure of the size of the site based on the distribution of artifacts and features. The value is in square meters.

Site Contents

Sites are also defined by the presence of **features**, **artifacts**, that are the preserved remains of past human activities. These items provide important information about how and when sites were used. A great deal can be learned about prehistoric societies from the size of their sites, the kinds of activities that took place there, and the season of the year and amount of time that people spent there.



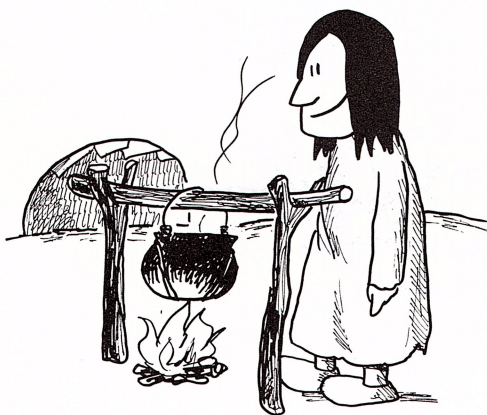
Features

Feature is the term used to describe the non-portable facilities and equipment that are products of human activity. Features include things like fireplaces (hearths), huts, burials, mounds, and the like. These remains often leave visible traces in the ground as an indication of structures that were created in the past.

Huts: Several kinds of structures were present in Fugawiland. Dwellings are found at some of the sites. These houses had a framework of poles and branches which supported coverings of reed mats, birchbark, or animal skins. There were both round and square huts. Both kinds of structures were about the size of an average room in a modern house.

Some huts are much sturdier than others with thicker walls and more substantial construction. The heavier structures, either round or square, are shown on the sites plans with double walls. The huts of lighter construction are shown with a single wall.

The huts in Fugawiland likely would have held 4-6 people. These structures usually contained sleeping areas for the inhabitants and one or more hearths. One way to estimate the number of people living at a site is simply to multiply the number of houses by five.

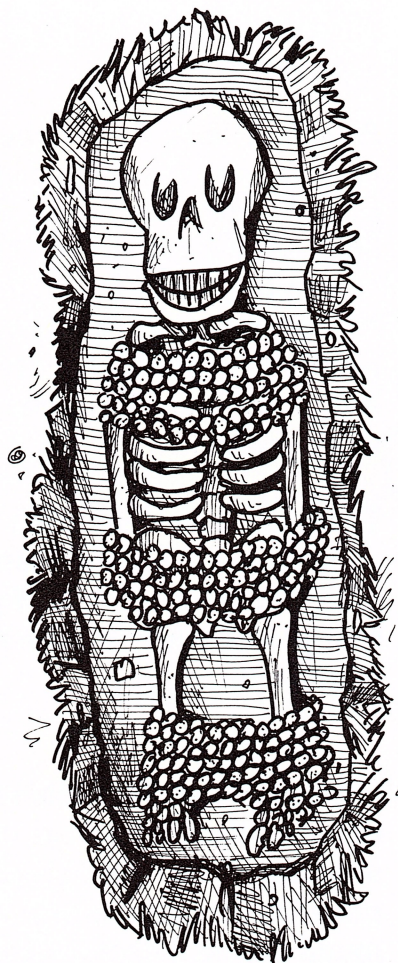


Hearths: Fireplaces are found at almost all sites in Fugawiland and were used for cooking, heating, light, and as a center of ceremonies. Fireplaces were usually made in a small pit and show up in excavations as depressions filled with pieces of charcoal and ash. Two different sizes of hearths are present at sites in Fugawiland. The location of the fireplaces with regard to the structures may also be important. More fireplaces may have been built inside houses during the winter.

Graves: Burials in Fugawiland were generally simple, with a single individual placed in a shallow grave or pit. Two kinds of burials have been found, either a complete skeleton laid out in a grave — an **"Extended Burial,"** or only the large bones and skull of an individual in a small, circular burial pit — a **"Bundle Burial."**



These two types of burials may reflect the time of year a person died. The ground would have been frozen for much of the winter. People who died during the colder months of the year may have been placed on outdoor scaffolds so that the flesh on the body disappeared until only the skeleton remained. These bones would then have been collected and placed in a hide bag for burial. Individuals who died during warmer months may have been buried immediately in shallow graves. A few items of pottery or food were often placed in burials as offerings and grave goods for a life after death.



Artifacts

Artifacts are portable tools and materials made or modified by humans. Artifacts include weapons and equipment as well as manufacturing refuse. These materials are often found broken at sites as a result of being discarded or abandoned as useless. A large quantity of refuse at a site is the result of more people living at the place, or long periods of occupation, or both.

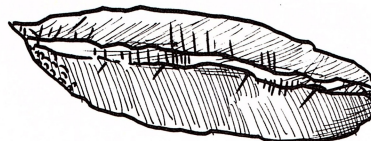
Arrowheads



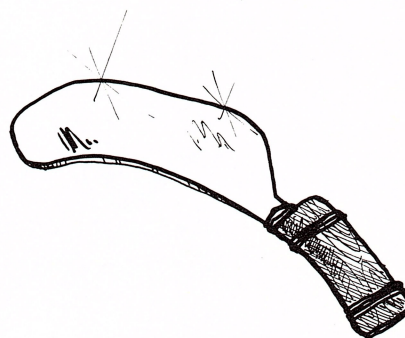
Projectile Points: Arrows were used for hunting and perhaps as weapons in Fugawiland. The tips of these projectiles were arrowheads, made from flint, obsidian, or other very hard stone. These points were made by "knapping," or chipping, the stone into a desired shape. Arrowheads are usually small, one or two inches in length. Arrowheads have two important parts, a pointed end to penetrate the target, and a rear end to attach to a wooden shaft.

These artifacts were used for hunting deer and other animals and likely were associated with male activities. Sites which contain lots of projectile points may represent places where such equipment was repaired and manufactured.

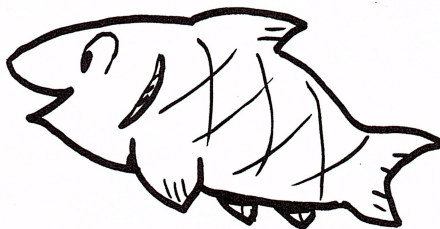
Obsidian Knives: Obsidian is a glassy, black stone produced naturally in areas of volcanic activity. Molten sand cools into this glass-like rock that was highly prized for making stone tools. This material is rare and found only in the southwestern corner of the study area in Fugawiland. The people of Fugawiland made long, sharp knives from obsidian. Obsidian knives with wooden or antler handles were about the size of a large kitchen paring knife, fragile but very sharp.



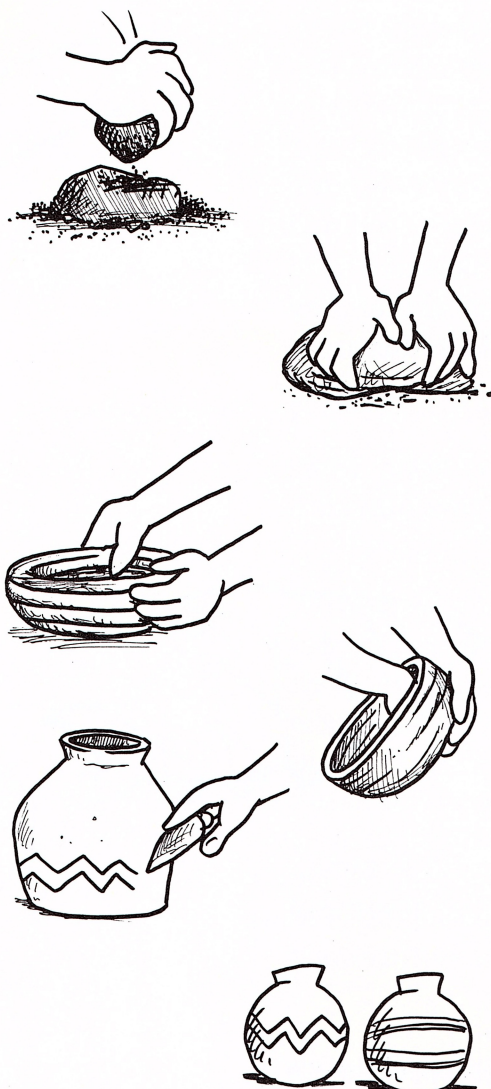
Copper Knives: These sharp blades were made from native copper nuggets. The only source of copper in Fugawiland was in the northwestern corner of the area. Several nuggets were cold-hammered together and sharpened into a good cutting tool. These knives had a long curved edge and were probably set in a wooden handle. The knives were roughly the size of a small hunting knife. Copper knives were durable, but dulled easily. Copper was a highly valued material that may have been traded or exchanged by people in this area.



Fish Hooks: These items were carved out of bone. Most of the fish hooks in Fugawiland were of medium size, perhaps two inches in length, used for line fishing in rivers and streams. These hooks were effective for catching bass, pike, trout, and other species. Large nets were also used for fishing in Fugawiland, primarily around the river mouths. Large lake trout are found close to shore and in the rivers around the Great Lakes primarily in the spring and summer. The bones of fish show up in large quantities at some of the sites in Fugawiland.



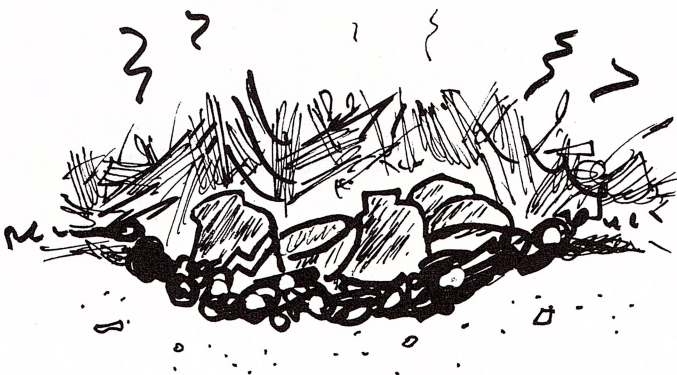
Shell Pendants: Shells from freshwater mussels were used to make small beads, pendants, and necklaces found at many sites in Fugawiland. Small irregular pieces were cut out from the shell. Then holes were made in each piece using a bow drill. Circular beads were made by rubbing a string of the irregular pieces on a grinding stone until they were round. Shell pendants are found only in the burials of women and children.



Pottery: The pottery made and used by the people of Fugawiland is fairly simple. It was made from deposits of clay readily available in Fugawiland. Pots were made in only one form, known as jars, and were probably used for both cooking and storage. These jars were fairly large and held about a gallon. Broken fragments of pottery vessels, known as **pot sherds**, are found on all the sites in Fugawiland where cooking and/or storage activities took place.

These large jars were decorated by drawing lines in the soft clay of the vessel before they were hardened in a fire.

Two different styles of decoration around the top of the vessel are known from Fugawiland: a zig-zag design (classified as "ZZ") and another pattern with horizontal bands (called "banded"). The location of the sites where these two different styles are found may be of use in distinguishing groups of people in Fugawiland.

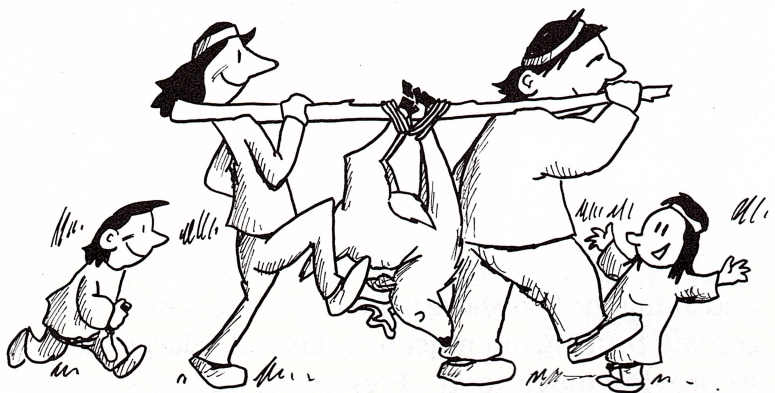


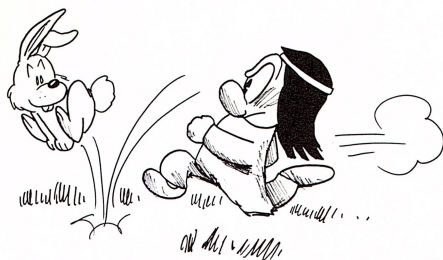
Food

Although a variety of different plants and animals were eaten by the people of Fugawiland, only a few species provided the bulk of the diet including white-tailed deer, rabbits, fish, mussels, and acorns. These species are available at different times of the year depending on climate, elevation, and other factors. It is important to consider each of these food sources in terms of where it could be found and when during the year it was available.

White-Tailed Deer: This large herbivore was a major source of food for prehistoric people in the Eastern United States and was abundant throughout Fugawiland. In addition to their meat, antlers and hides were also used as raw materials for making tools and clothing.

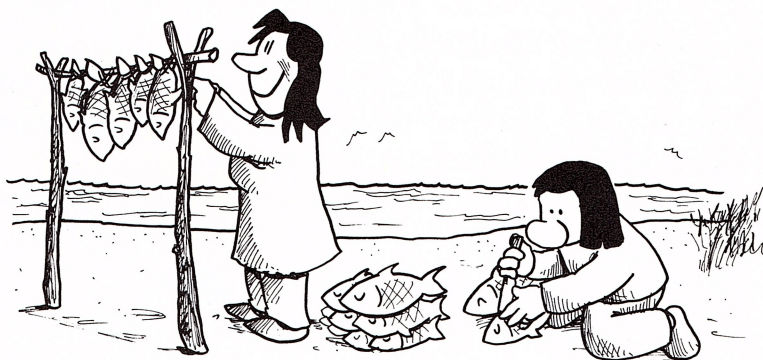
White-tailed deer are most easily hunted during the fall mating season when they are more curious and mobile than at other times of the year. Deer are also heavier and fatter in the fall. These animals concentrate in inland areas at higher elevations during the fall and winter. The deer were hunted largely by men. Deer remains on archaeological sites are most commonly found as pieces and fragments of bones, teeth, and antler.





Rabbits: Cotton-tailed rabbits are another important source of food in Fugawiland. These rabbits are snared or trapped by everyone for meat and fur. Rabbits were available year-round but were fattest in the summer, fall, and early winter. Rabbit meat is so lean in the springtime that a diet of only rabbit can lead to starvation. Rabbit skins were used to make warm blankets. The evidence for rabbits in Fugawiland is usually found as bone fragments.

Fish: Although several species of fish were present in the waters of Fugawiland, lake trout provided the bulk of fish in the diet. Lake trout were taken with both nets and hook and line. Lake trout are found close to shore and in the river mouths around the Great Lakes primarily in the spring and summer. This species nests upstream in the fall and winter. Fish bones are often found on archaeological sites near water in Fugawiland.



Shellfish: Freshwater mussels flourished in the streams and along the lakeshore in Fugawiland. These shellfish contain protein, but must be collected in large numbers to provide much food. Freshwater mussels are most accessible and nutritious in the fall and spring.

The shells themselves were used for beads and pendants. Shell fragments are often preserved on sites where mussels were eaten or where shell was made into items like jewelry. Large dumps of shells are known as shell middens. In places like Japan, Kentucky, or Denmark these middens may be hundreds of feet long and tens of feet high.

Shell Beads and Middens

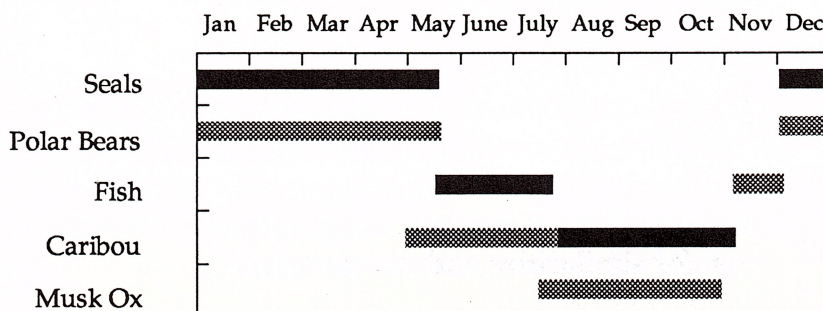
Acorns: Acorns fall from mighty oaks which grow largely in the western portion of Fugawiland. These nuts ripen in the fall and must be collected before they are eaten by deer, squirrels, and other animals. Acorns can be stored for three or four months for the winter lean period. Acorn nutmeat is roasted and pounded into a flour in wooden mortars. Middens, or dumps, of burned acorn shells are sometimes found at sites in Fugawiland.



Before farming was adopted, human societies hunted and gather the wild products of the earth. In most cases they used these foods when and where they were available in a seasonal subsistence pattern. A similar cycle can be expected in Fugawiland.

Subsistence Pattern

Below is an example of the kind of seasonal food use often seen among pre-agricultural peoples. This example comes from the Copper Eskimo of northern Canada where seals, polar bears, fish, caribou, and musk ox are the major sources of food at different times of the year.



 More Intensive Use
 Less Intensive Use

Seasonal Food Use Among Aboriginal Copper Eskimo

CHAPTER X

ANALYSIS OF DATA

Are there different kinds of sites in Fugawiland? You may already have noticed some differences while you were excavating and looking at the sites. If you can distinguish several kinds of sites, you will also need to determine which sites belong to which type. Recognizing different types of sites is the best way to understand some of the patterns in Fugawiland.

Analysis Options Menu

Analysis Menu

6= Table of sites
5= Sort
4= Histogram
3= Plot
2= Map of Fugawiland

1= Help
0= Exit

There are several tools available in the Option Menu to help you in the search for similar groups of sites. The Table, Sort, Bar Graph, and Plot options are described here. The Map of Fugawiland option allows you to look back at the site plans at any time to review the information.

TABLE OF SITES — This on-screen table provides information on the location and contents of the sites you have excavated. This is the major source of information for analysis. You should look over this table very carefully to see if you can observe differences between the sites. Be sure to review your notes in Part IV for ideas on the site characteristics that may reflect different kinds of sites.

SORT — This option will help you study the table of information for similarities and differences. The Sort option lets you order the columns of information from highest to lowest number to help you study the information for similarities and differences.

Pick one site characteristic and Sort will order all the values for that characteristic from fewer to more, or from smaller to larger. Using the Sort option lets you

look for patterns in the table more easily. After you have sorted one characteristic, look at other variables in the table to see if they follow the same, or different, pattern.

For example, ask the question: "Do sites at lower elevations have more arrowheads?" In the first three columns below are some hypothetical numbers for site designation, site elevation, and number of arrowheads. The sites are listed in the order they were excavated.

Site No.	Elevation	#Arrowheads
Y	5	7
M	200	55
N	100	29
Q	40	15
C	130	35
X	90	33
U	210	51

Sorting on the values for elevation and then looking at elevation and the number of arrowheads per site will help answer the above question. As you can see, the number of arrowheads increases along with elevation in the series that is ranked from low to high elevation below.

Site No.	Elevation	#Arrowheads
Y	5	7
Q	40	15
X	90	33
N	100	29
C	130	35
M	200	55
U	210	51

The answer to the question then is no. Now ask your self why sites at higher elevation have more arrowheads.

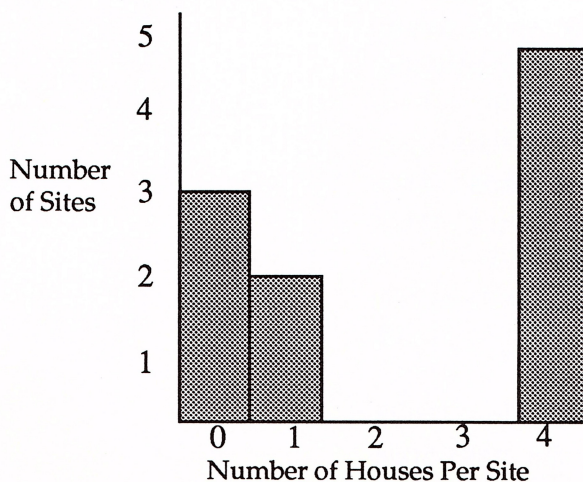
Use the Sort option to examine a number of the site characteristics and see which ones follow a similar pattern.

Graphs

There are two choices for graphs, visual displays of data, in the Option Menu — Bar Graphs and Plots — that also will help you look for patterns in the excavated information. A graph consolidates large amounts of data into a form which is both aesthetically pleasing and easy to comprehend.

BAR GRAPHS — You can draw a bar graph of one column of information, that is, one characteristic of the sites. A bar graph will show you the number of sites with each kind of feature or artifact. Bar graphs help you to look for groups of similar sites. Look for steps or gaps between bars, or significant changes in the heights of the bars.

For example, you might ask for a bar graph of the number of houses at each site. A graph will appear which shows the number of houses per site on the X-axis and the number of sites on the Y-axis. A hypothetical graph is shown here.



The location of the vertical bar indicates the number of houses per site and the height of the bar indicates how many sites with that number of houses are present in Fugawiland. In this example, there are 3 sites with no houses, two sites with one house and five sites with four houses. Why are there no sites with two or three houses? Are sites with no houses different from sites with one house in other

ways too? It appears from this graph that there are some sites with few houses and some sites with more houses and some sites with no houses.

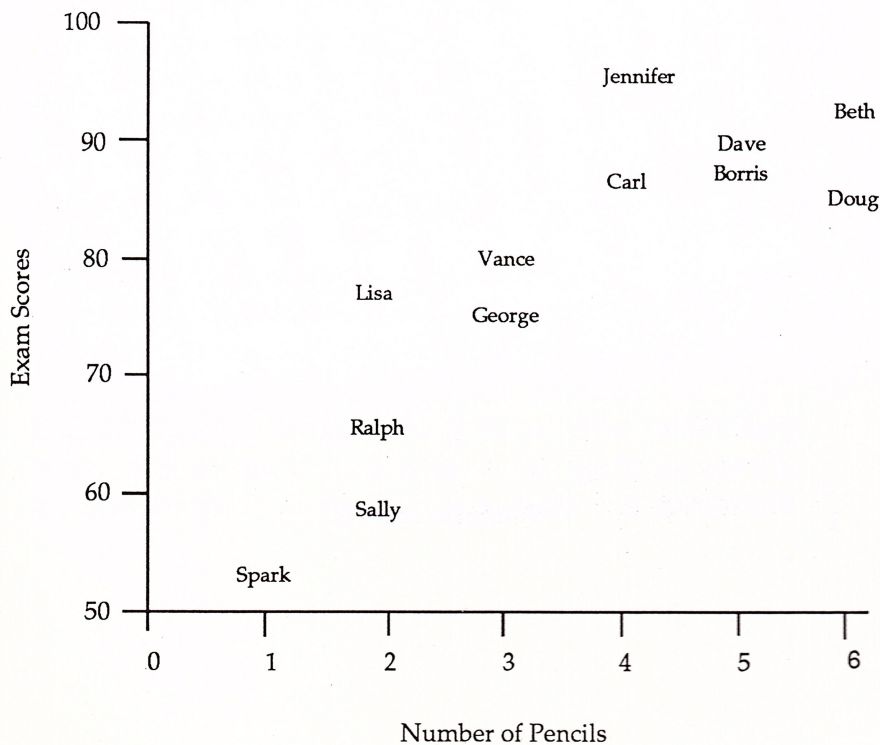
Plots

Another option, Plot, will allow you to look at two columns of information simultaneously. One way to think about scatter plots is to use a contemporary situation. Let's say you were trying to see if there are different kinds of people in your class in terms of preparing for exams.

One idea might be that well prepared students do better on exams. If you could count the number of pencils each student took to an exam [as a measure of preparedness for the exam] and compare it with their score on the exam, the table of information would look something like this:

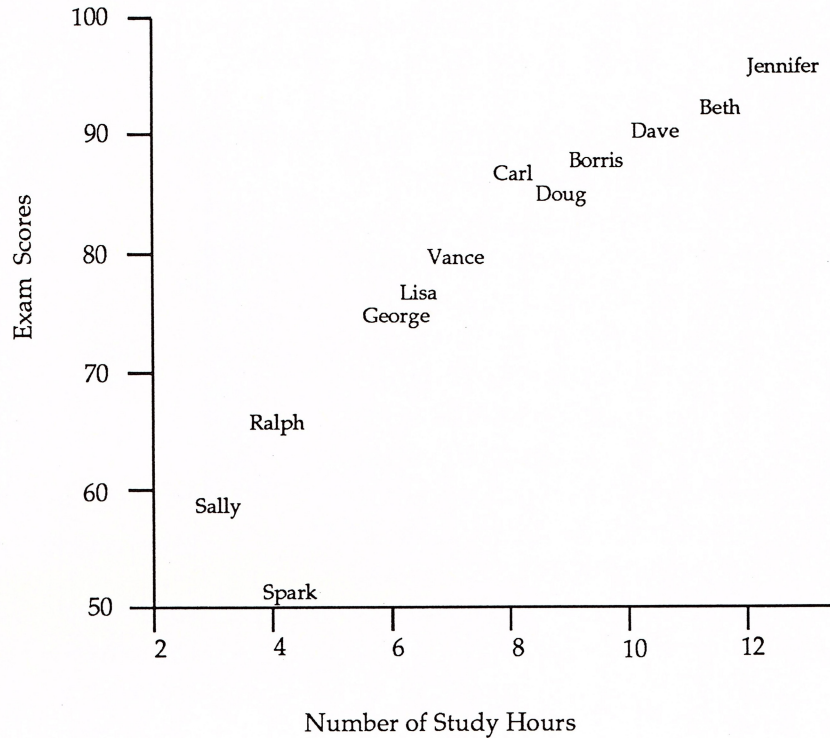
Dave	5	90	Doug	6	85
Sally	2	58	Jennifer	4	95
Ralph	2	65	George	3	75
Vance	3	80	Spark	1	50
Carl	4	86	Borris	5	88
Lisa	2	77	Beth	6	92

If we then plotted the number of pencils against exam score, the plot would look like this.



Notice that people with more pencils and higher scores appear in the upper right of the plot. Notice also that there is a clear trend, seen in the linear arrangement of the names, that the more pencils one has (that is, the more prepared one is) the better the score on the exam.

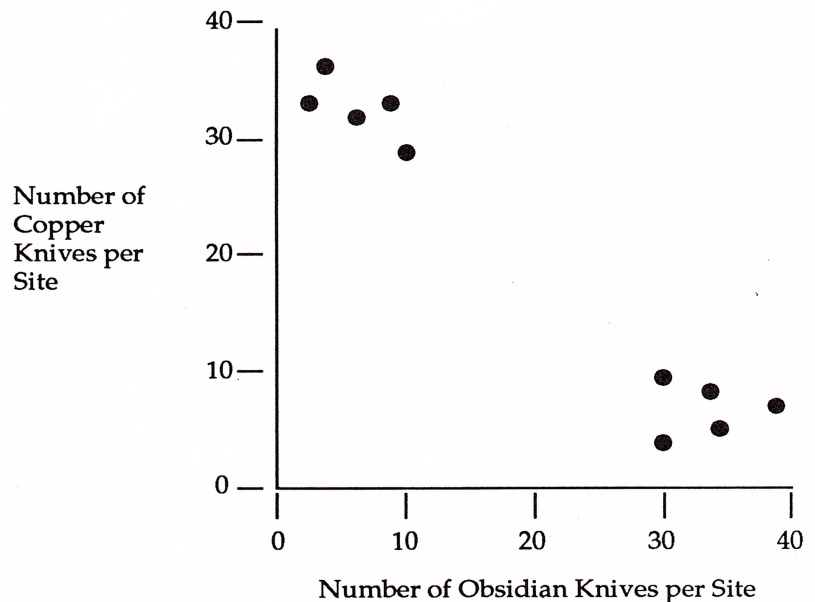
Now pencils are probably not as good a measure of preparedness as other things. Let's ask each student how many hours they spent studying for the exam and record that information. Now let's draw a new plot of exam scores and hours of study. With a better measure of preparedness (hours of study) the pattern is much clearer. The line of names is much straighter. There is a strong *positive* relationship between amount of time spent studying and scores on exams: the more hours of study, the higher the score.



Now let's think about this in terms of the past. How can a plot of information about the contents of archaeological sites tell us about prehistoric society? For example, how can the numbers of copper knives at a site tell us anything?

Let's look at another imaginary plot of copper knives per site vs. the number of obsidian knives per site (each dot is a site). The plot below shows copper knives on the Y-axis (vertical) and obsidian on the X-axis (horizontal); each dot represents one site. Look for groups of dots or lines of dots. Groups of dots indicate groups of sites; lines of dots indicate a trend — that sites with more of one thing also have more (or less!) of the other item.

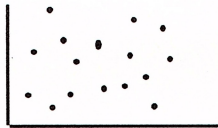
In this case, there is a clear relationship between the number of obsidian knives and the number of copper knives at the sites in Fugawiland. It is a *negative* relationship. Where copper knives are common, obsidian knives are rare, and vice versa, where obsidian knives are common, copper knives are rare. There appear to be two groups of sites in the plot: one group, upper left, with more than 25 copper knives and less than ten obsidian knives, and a second group in the lower right with more than 30 obsidian knives and less than 10 copper knives.



From this plot we learn a new pattern in the distribution of artifacts at sites in Fugawiland and again we have to ask the question, "Why are these differences present?"

Look for a number of possible relationships in your excavation data from Fugawiland. You should be able to find such trends among many of the site characteristics using the plot option.

The following patterns are important to keep in mind when you look at plots.



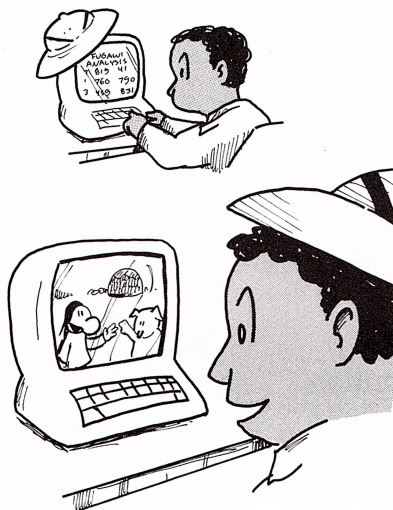
Random - no relationship indicated among the dots in the plot.



Linear - clear relationship present. A positive trend means as one item increases or decreases so does the other. For example, in the plot above, as the number of arrowheads per site increases, so does elevation.



Clustered - groups of items are present and visible on the plot. Again in the example above, there are sites with lots of obsidian and little copper, and vice versa. This pattern would suggest that different kinds of sites were present in Fugawiland and that there were different patterns in the exchange of raw materials.



Now go to the Report of Investigations and draw the two plots by hand to use in the analysis of the data from Fugawiland. After you draw a few plots by hand, use the Plot option in Fugawiland to look for more patterns.

CHAPTER XI

MULTIPLE CHOICE QUESTIONS

Fugawiland will pick ten of these questions for you to answer on the computer. Remember that you can look at these questions at any time during the assignment, you can change your answer as often as you want until you are finally done, and you will receive a print out of your answer sheet.

You may also want to write the questions and answers down in the space below in case there is a problem with printing the answer sheet.

No.	Question
-----	----------

Answer

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper appears slightly aged or off-white. There is no handwriting or other markings on the page.

CHAPTER XII

EXITING THE PROGRAM

Fugawiland gives you the option to leave the program at any time, and return later to continue where you left off during your excavations. This same option will allow you to re-enter Fugawiland if an error occurs while you are using Fugawiland. You can stop in the middle and return to the assignment at a later time. Just follow the steps indicated by the computer.

You also use the Exit option when you have completed your excavations and analysis and answered the ten multiple choice questions. When you are satisfied with your answers, select the Exit option. You will be shown a summary of your answers and instructed to print out your answer sheet.



In order to use this option, it is important to type correctly your name and student identification number at the start of each Fugawiland session. If you have any questions please see your instructor.

PART IV

REPORT OF INVESTIGATIONS IN FUGAWILAND

by _____

Date _____

Introduction

This part of the workbook is for your written report on Fugawiland. **Please fill in all the information as directed below, as well as your name and the date above.**

There are several different sections of this report. The first section deals with finding sites through interviews, field walking, and geophysical prospecting. The second section is concerned with the dating and stratigraphy of sites in Fugawiland. The third section is a summary of the results of your excavations and analysis of the information you recovered. The fourth section involves an essay on your impressions of Fugawiland and the pre-historic peoples who lived there.

When you have completed this part of the workbook, fill in your name above, tear out the pages of Part IV and turn them in to your instructor, along with the print out of answers to the multiple choice questions in the Fugawiland program. Remember that you may want to include plans, illustrations, graphs, or information from the computer to substantiate your findings in this report.

Discovering Sites

Bob Anderson has a large farm in northeastern Wisconsin and owns part of the area that was Fugawiland. An interview with Mr. Anderson revealed that he once found some pot sherds and an arrowhead next to the river, but the items are now lost.

Mr. Anderson allowed three archaeologists to survey one of the fields behind his farmhouse. A systematic field survey was made at 10 meter intervals. More intensive surface collections were made in areas where chipped stone artifacts, pot sherds, shells, or discolorations of the soil were found. Soil samples were taken at 10 meter intervals for phosphate analysis.

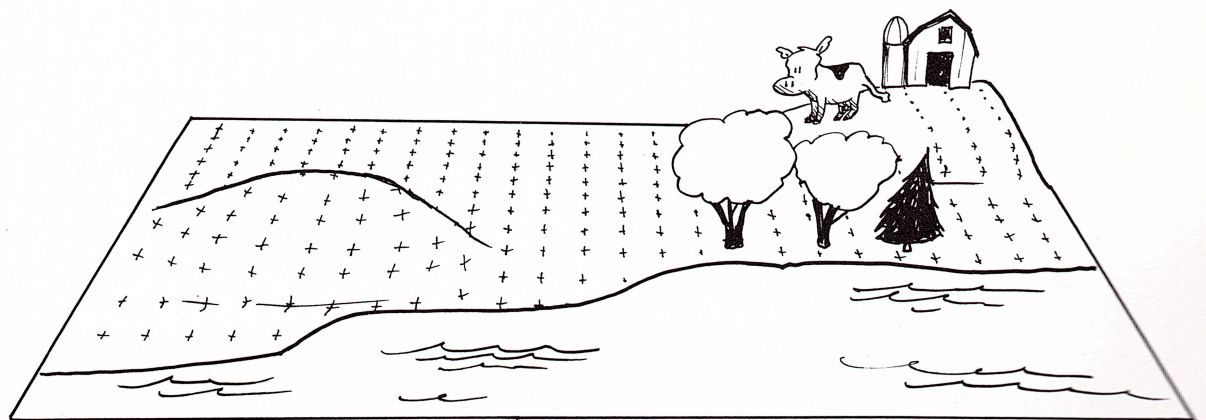
The information collected during this survey is provided on the maps below. These maps also show a 10 meter grid across the fields. Each grid square measures 10 x 10 meters. The first drawing is a sketch of the general area with some important topographic features such as the shoreline and the Anderson farm yard.

The second map contains a series of numbers recorded for making a contour map. The numbers on this map are elevations in meters above sea level as measured by the surveyor. The values range from 111 - 140 meters. **Draw contour lines on this map to determine the high and low areas. Use an interval of 5 meters of elevation for these contour lines. Draw contour lines enclosing areas with elevations of 115, 120, 125, 130, 135, and 140 meters.**

Map 3 shows the number of chipped stone pieces, pot sherds, and other artifacts that were collected in each 10 meter grid unit during the survey. The values range from 0 per grid unit to a maximum of 60 artifacts per grid unit. In order to better visualize what these numbers mean, it is useful to draw contour lines around the areas of high artifact density. **Draw contour lines on the map of artifact density. Use a contour interval of 10 artifacts per grid unit. Draw lines enclosing areas of more than 10, 20, 30, 40, 50, and 60 artifacts per grid unit.**

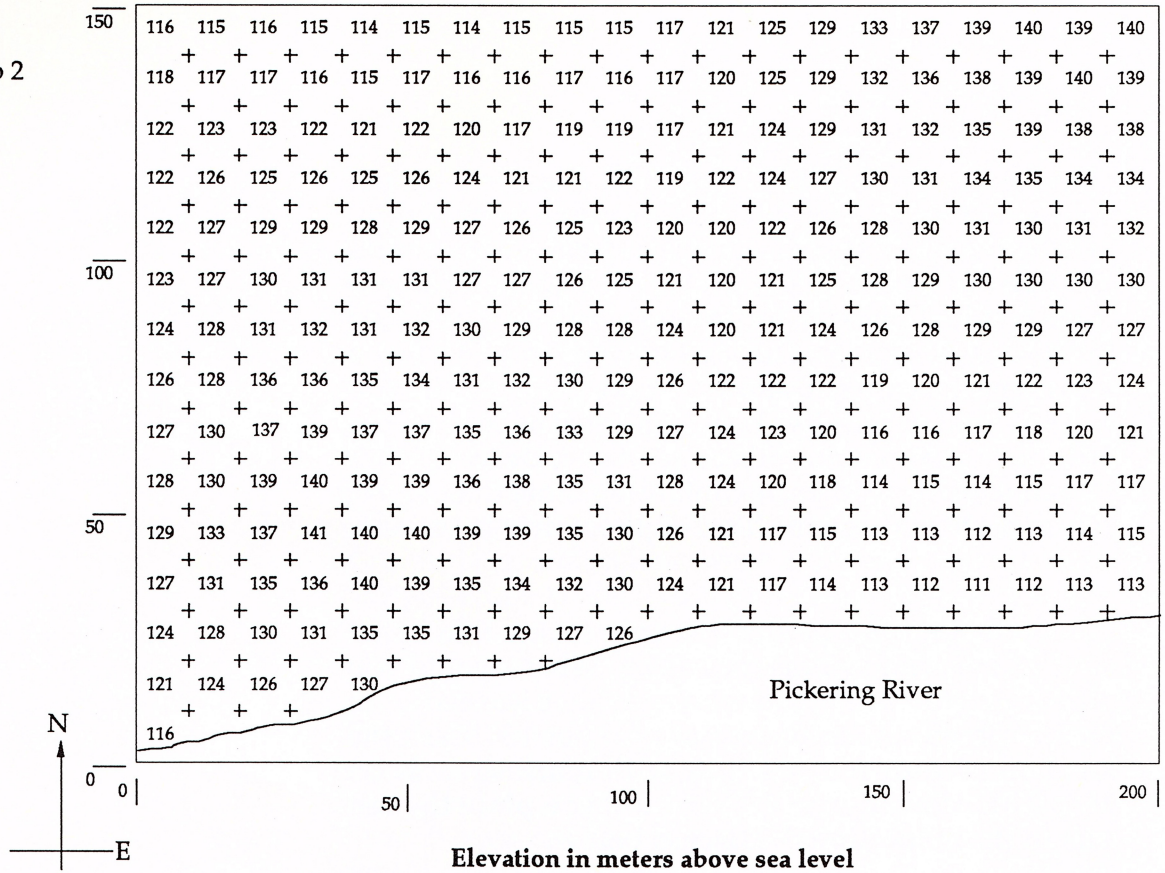
Map 4 shows levels of phosphate in the area in parts per million in the soil samples. Values range from 50 ppm to 120 ppm across the survey area. Higher levels are indicative of more human, or animal, activity. There is some residual phosphate almost everywhere here due to artificial fertilizers. **Draw contour lines on Map 4 to represent the concentrations of phosphate as an indicator of human activity. Use an interval of 20 parts per million to draw contour lines on Map 4. Draw contour lines enclosing grid units containing more than 60, 80, 100, and 120 parts per million of phosphate in the soil.**

You have time and permission to excavate four small test pits in Farmer Anderson's field. Where would you place these test pits given what you have learned from the distribution of artifacts and phosphate? **Mark the location of your four test pits with black squares on Map 2, the elevation map. Why did you place the test pits in those locations? Discuss below.**

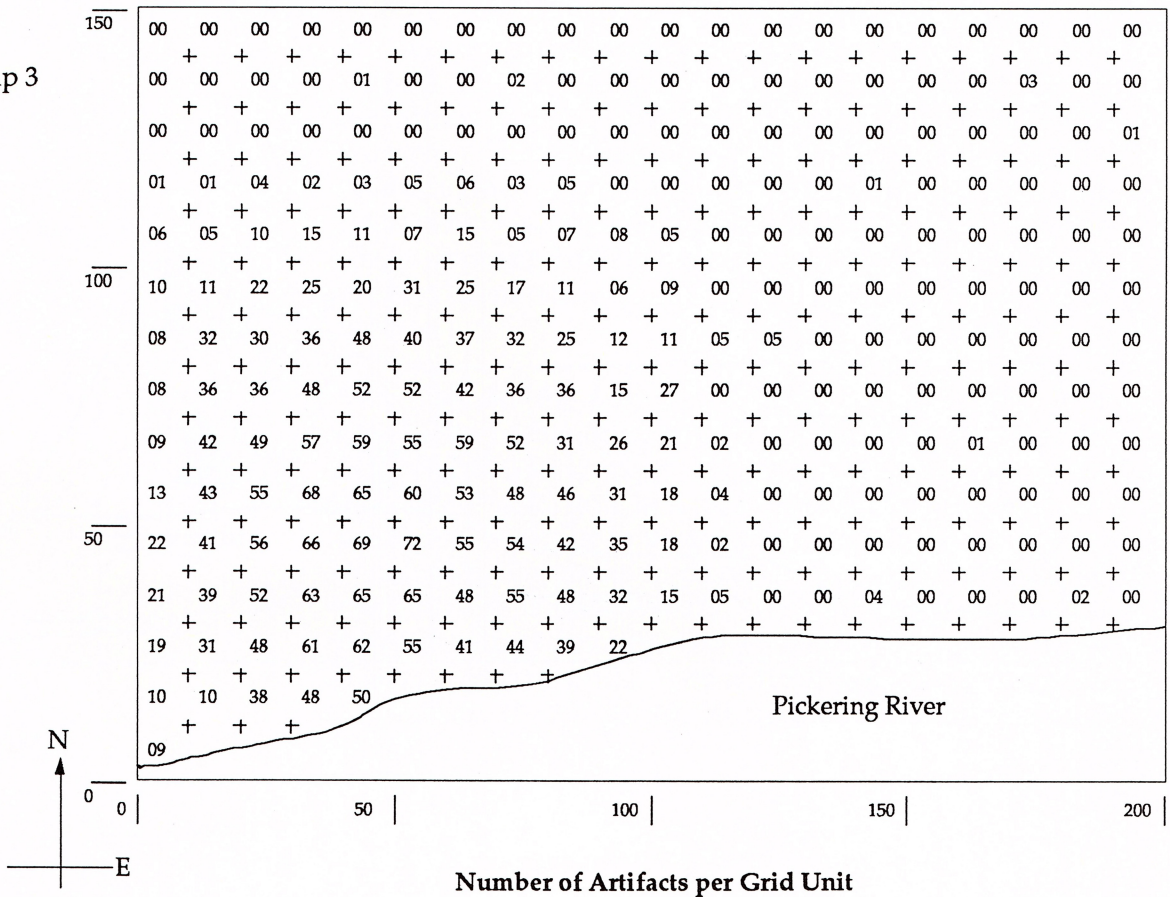


Map 1

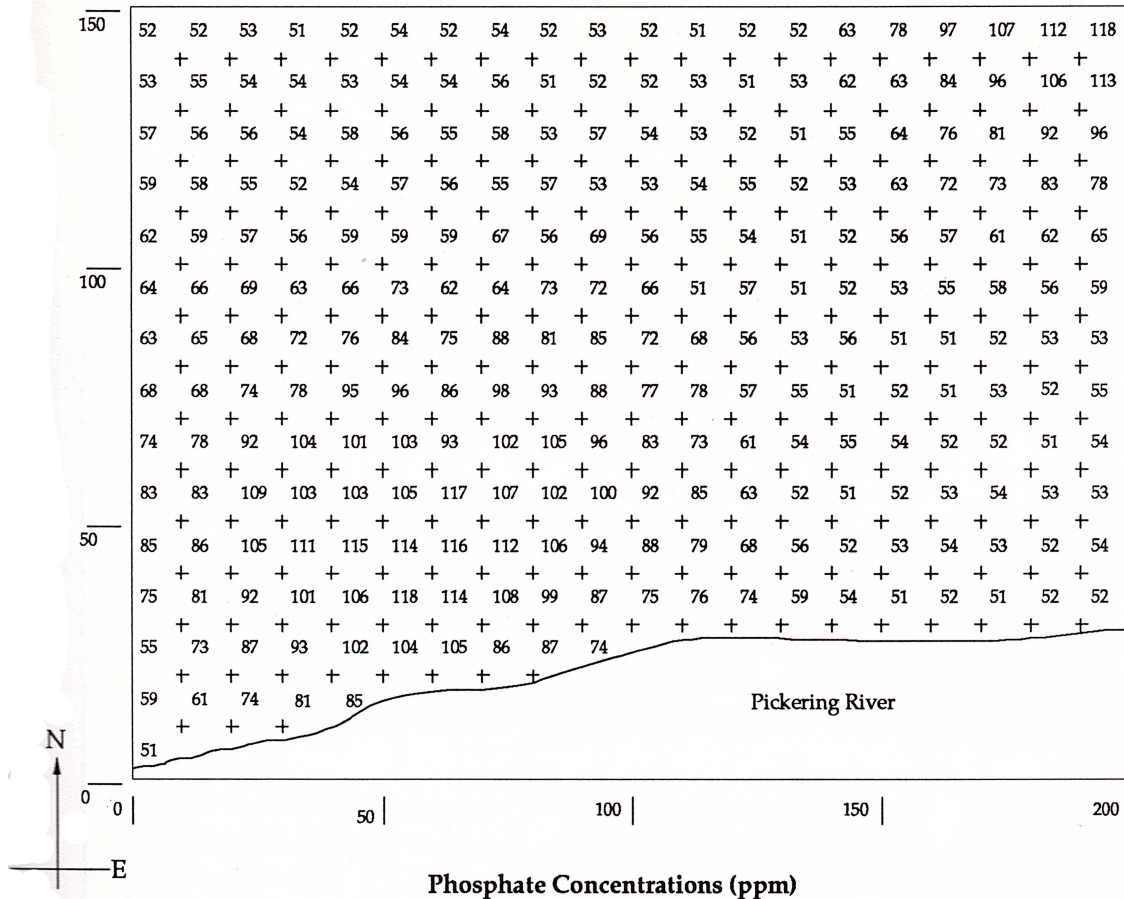
Map 2



Map 3



Map 4



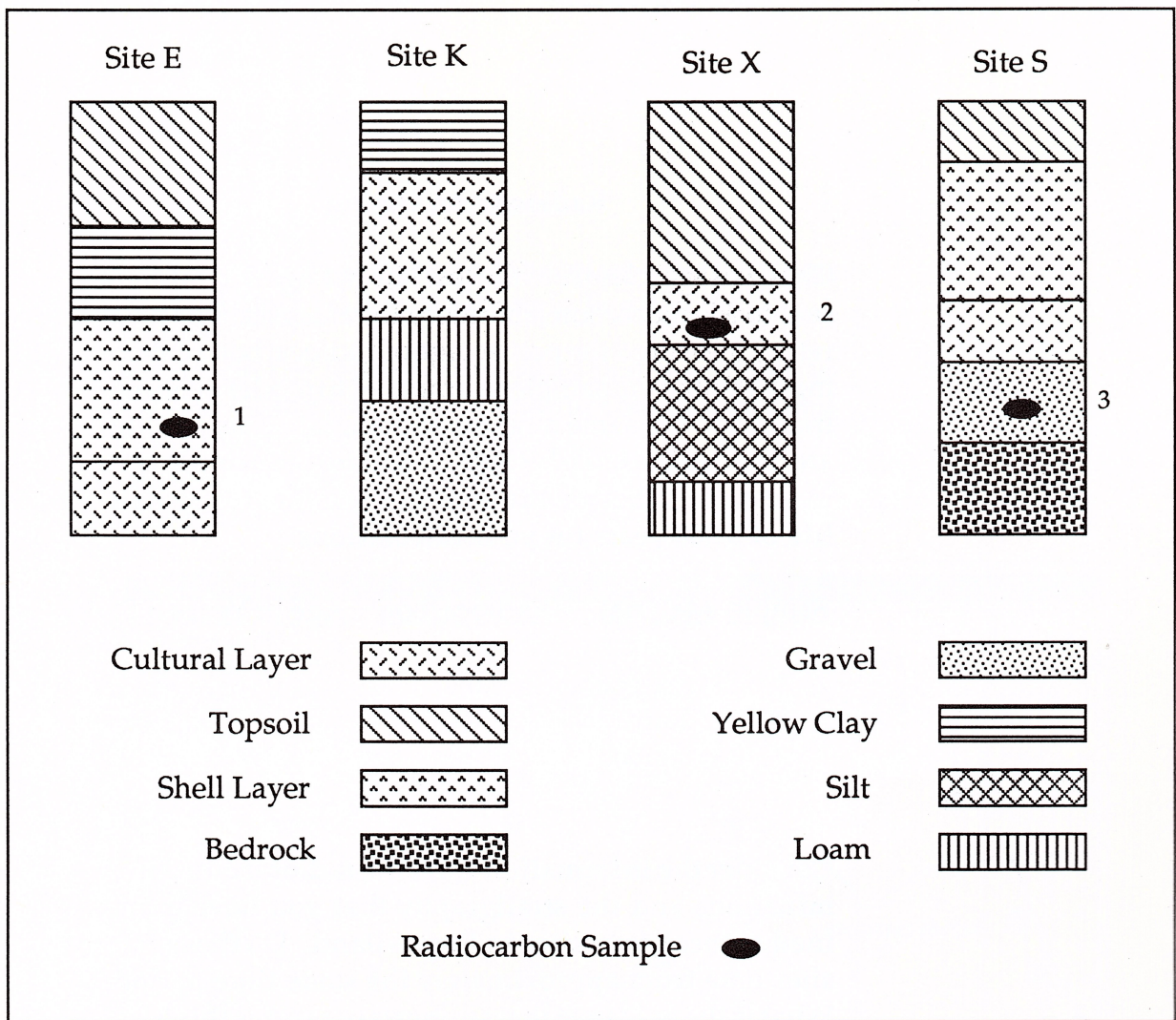
Discuss the results of the survey. What was found? What does the information from the distribution of the artifacts and the phosphate values suggest? How many sites are there in the survey area? Answer these questions in one or two paragraphs in the space below.

Dating and Chronology

Test pits were excavated at several of the sites in Fugawiland prior to the beginning of excavations. These test pits were used to expose the stratigraphy, obtain samples for radiocarbon dating, and to help determine if the sites were occupied at the same time.

The stratigraphy at these sites contains both geological and archaeological layers. Analysis of the stratigraphy indicated that the archaeological layers were of approximately the same age. The stratigraphy from these sites is shown on the next page. Radiocarbon sample locations are shown as black areas on the stratigraphic drawings. The numbers are for the radiocarbon samples.

Examine the layers from the four sites shown on the next page and work out the complete sequence for all the sites assuming that the individual layers occur throughout the area. You can determine the sequence of layers for the whole area by examining their order. Fill in the blank stratigraphic chart at the bottom of the next page with the appropriate symbols for each layer. Write the name of the layer beside the box that contains it. Why are some layers of different thickness at different sites?



Fill in the correct sequence for the layers from Fu-gawiland, using the symbols above. Write in the name of the layer as well.

Youngest

Oldest

Radiocarbon Dating

Charcoal samples from the test pits in Fugawiland were sent to a radiocarbon laboratory for analysis. The laboratory measured the percentage of radiocarbon remaining in the ancient samples, compared to modern concentrations in the same amount of material. These values are listed in the table below. **Calculate the sample ages in years B.P. (before present) in the table. Use a half-life of 5,568 years for your calculations.**

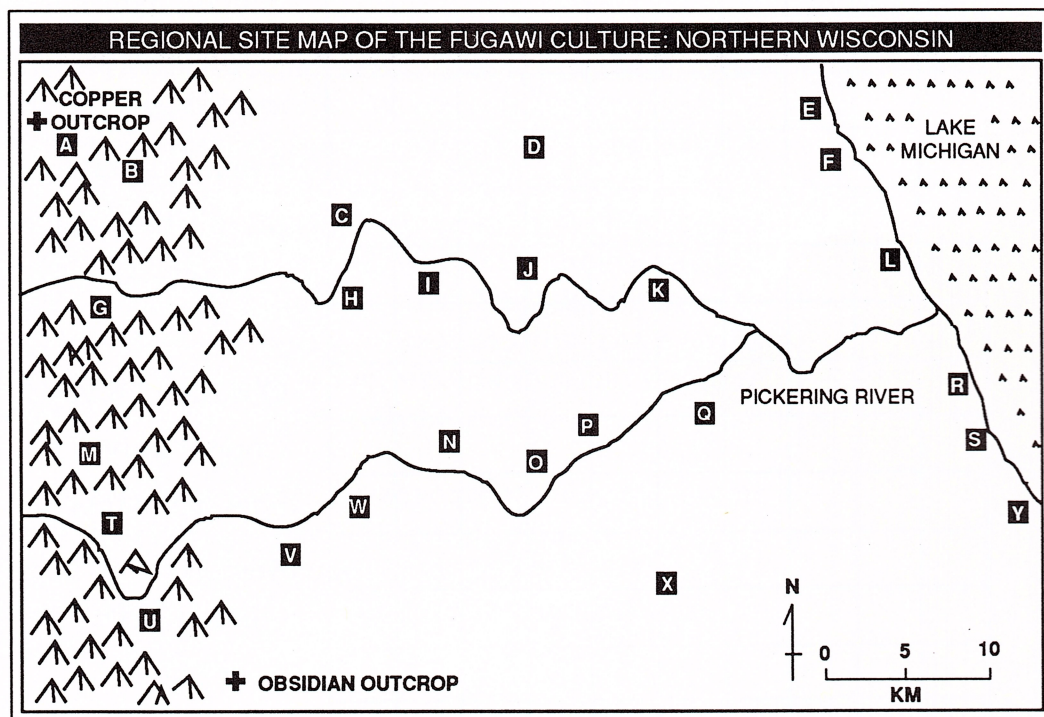
<u>Sample</u>	<u>Material</u>	<u>Radiocarbon</u>	<u>Age in Years B.P.</u>
1	Charcoal	70.0%	
2	Charcoal	56.0%	
3	Charcoal	35.0%	

Consider the information from the radiocarbon determinations and the stratigraphy that you have examined at these four sites in Fugawiland. Do these four sites date from approximately the same time period? What is the evidence that supports or refutes this idea? Briefly discuss your results in the space below.

Excavations

In the following pages, record the information that you recover during your excavations in Fugawiland.

First, circle the letters of the sites that you chose to excavate on the map below and indicate if you used random or intuitive sampling.



☐ Random

☐ Intuitive

Next, fill in the table on the following page with the information you obtain from your excavations. This information is the basic data you will use in your analysis of Fugawiland. If you want, use some scratch paper to sketch the more important sites that you have excavated; or you can ask the computer to print out specific site plans for you.

Findings from Fugawiland

[illegible]

Data Analysis

Now you have all the available information from your investigations of Fugawiland. It's time to examine that information in detail to see what it can tell us about the archaeology of this area. **For this part of the assignment, you should use the tools in the Analysis Section of the Fugawiland program, along with making some calculations and drawings as directed below.**

Use the Sort function in the Analysis Section to order different site characteristics to look for patterns, similarities, and differences. When you have sorted the different kinds of sites that are present in Fugawiland, you should be able to describe them in terms of their distinguishing characteristics. For example, one kind of site might contain *more* arrowheads and be located at *higher* elevations than other sites. Such descriptions as more and higher are relative to other sites. These terms are useful for distinguishing kinds of sites, but you may want to be more precise in this report.

Sort

On the next page, write down some of the patterns you observe in the Sort part of the analysis. Fill in at least five of the boxes with pairs or groups of site characteristics that show a similar pattern in the table. For example,

Arrowheads increase
Elevation increases
Deer bones increase

or,

Arrowheads increase
Fish bones decrease

Fill in at least five boxes with two or three site characteristics that follow a similar pattern, either changing together or in opposite directions.

TOGETHER

OPPOSITE

A more exact statement of differences and similarities among the sites can be made by using the *average* number of artifacts, ecofacts, and other features at each kind of site. An average is calculated by taking the total number of artifacts found in the excavations in Fugawiland and dividing by the number of sites. For example, if the total number of arrowheads from your ten sites in Fugawiland was 450, then the average at each site would be 45. You could then state whether a site had more or less than the average number of arrowheads per site.

Averages

Calculate the averages for the different categories of artifacts and other materials from Fugawiland that are listed here. Use this information in your subsequent discussion of investigations.

<u>Category</u>	<u>Average</u>
Arrowheads	_____
Elevation	_____
Graves	_____
Pot sherds	_____
Houses	_____
Site Size	_____

Other useful information can be learned by calculating the density of artifacts and features at the sites in Fugawiland. Density is a measure of the number of items in a given area. You can determine the density of materials at the sites in Fugawiland by dividing the total number of objects from the site by the size of the site. This calculation gives you the density of materials per meter square and you can compare this figure between sites. Calculate the density of arrowheads and pot sherds at the ten sites you excavated in Fugawiland below. Discuss your results.

<u>Site</u>	<u>Site Size</u>	<u>Pot sherds</u>		<u>Arrowheads</u>	
		<u>Number</u>	<u>Density</u>	<u>Number</u>	<u>Density</u>
Site _____	_____	_____	_____	_____	_____
Site _____	_____	_____	_____	_____	_____
Site _____	_____	_____	_____	_____	_____
Site _____	_____	_____	_____	_____	_____
Site _____	_____	_____	_____	_____	_____
Site _____	_____	_____	_____	_____	_____
Site _____	_____	_____	_____	_____	_____
Site _____	_____	_____	_____	_____	_____
Site _____	_____	_____	_____	_____	_____
Site _____	_____	_____	_____	_____	_____

Percentages

Another way to consider how the artifacts and other materials are distributed at sites in Fugawiland is to calculate the percentage of these items at each site. For example, what percentage of all pottery is found at each site you excavated? Percentages are calculated by dividing the number of pot sherds found at one site by the total number of pot sherds from Fugawiland. Then multiply that number by 100.

Calculate the percentage of pot sherds and points that were found at each of the ten sites you excavated. Fill in the number of each category at each site. Add up the

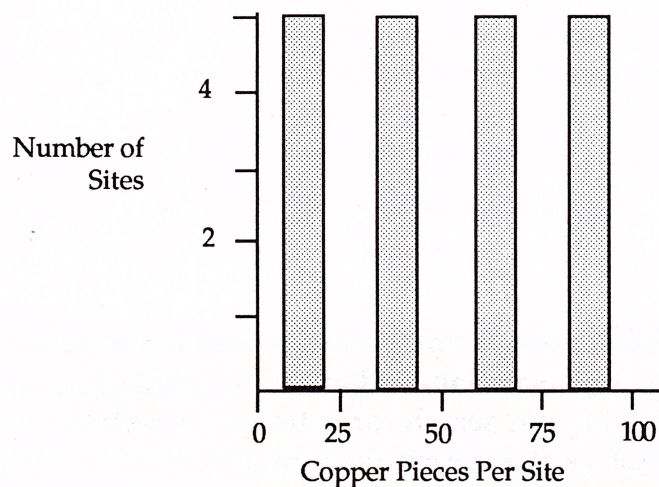
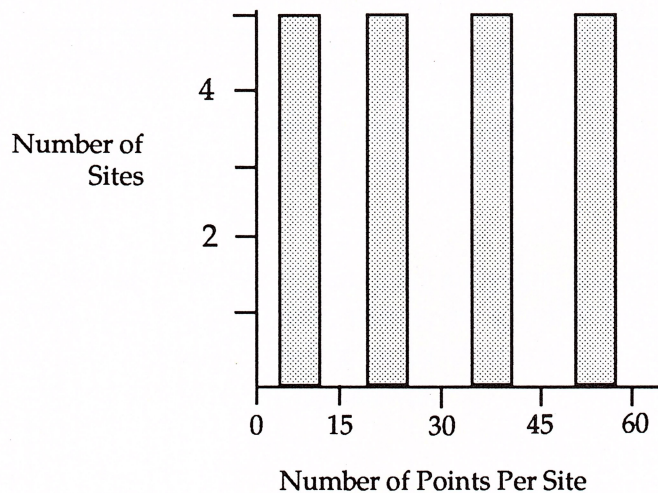
total number of points and pot sherds from your excavations in Fugawiland. Divide the number from each site by this total and multiply by 100 to determine the percentages. Be sure to write in the letter designation of each site. The sum of the percentages should be 100% for both pottery and points. Discuss your results below.

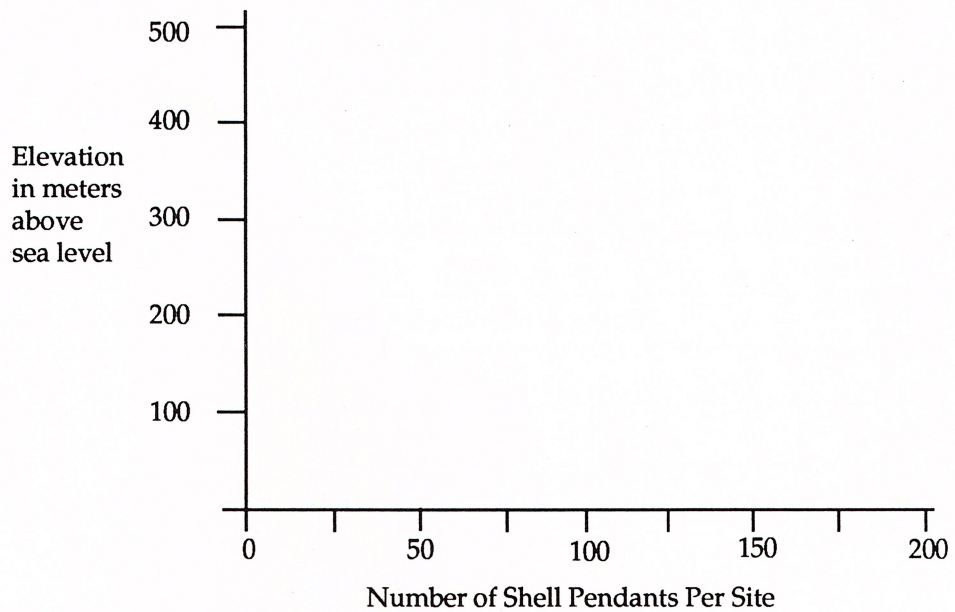
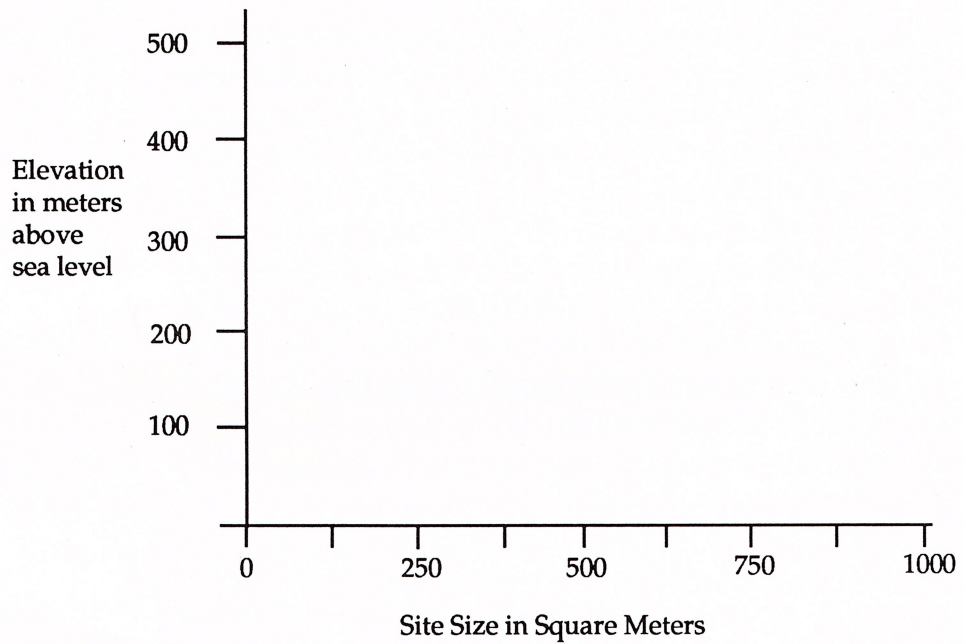
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Bar Graphs and Plots

It's a good idea to draw some bar graphs and plots by hand so that you understand how such charts are made and what they mean. Below are several charts for you to draw. The first two are bar graphs and the last two are for scatter plots.

Fill in the appropriate bars and dots from the information you obtained in your investigations in Fugawiland. Fill in the shaded areas with black bars to indicate the number of sites for the bar graphs. Use the site letter as a dot on the scatter plots.





Use the Bar Graph and Plot functions in the Analysis Section of Fugawiland to look at different site characteristics in your search for patterns. Attach the most informative of these graphs to this report of investigations.

Interpretation

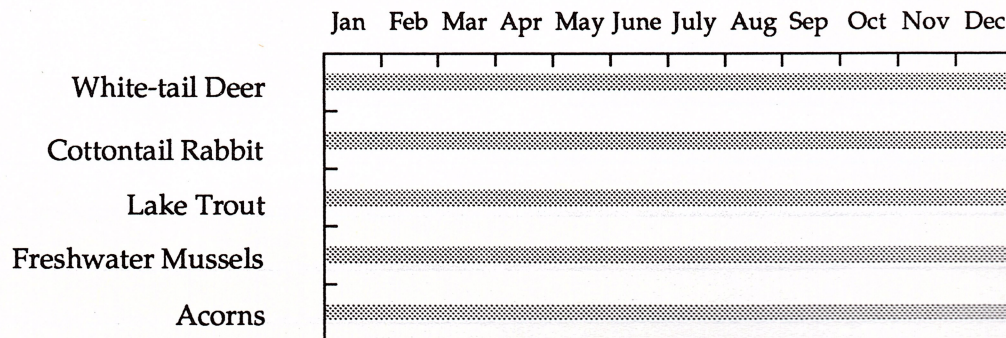
As part of the Fugawiland assignment, **write a brief essay in the following pages.** The focus of this essay should be on the settlement and subsistence patterns that you discovered in your excavations and analysis.

Your essay should consider the following questions.

How many types of sites are present in Fugawiland? What foods were obtained where at what times of the year? What kinds of information was most useful for distinguishing the different types of sites? How many groups of people are present in Fugawiland and how are they different? What information is useful to distinguish these groups? Is there evidence for trade or exchange? What other kinds of information would you like to have to better understand the archaeology of Fugawiland?

In addition to the written part of your answer you should attach site plans, maps, or graphs and your computer answer sheet to your discussion to document your ideas and arguments.

How would you describe the annual cycle of subsistence in Fugawiland? **Fill in the chart below, using black shading and diagonal lines, to indicate what time of year these foods were utilized in Fugawiland.**



■ Most Intensive Use
▨ Less Intensive Use

Food Use in Fugawiland

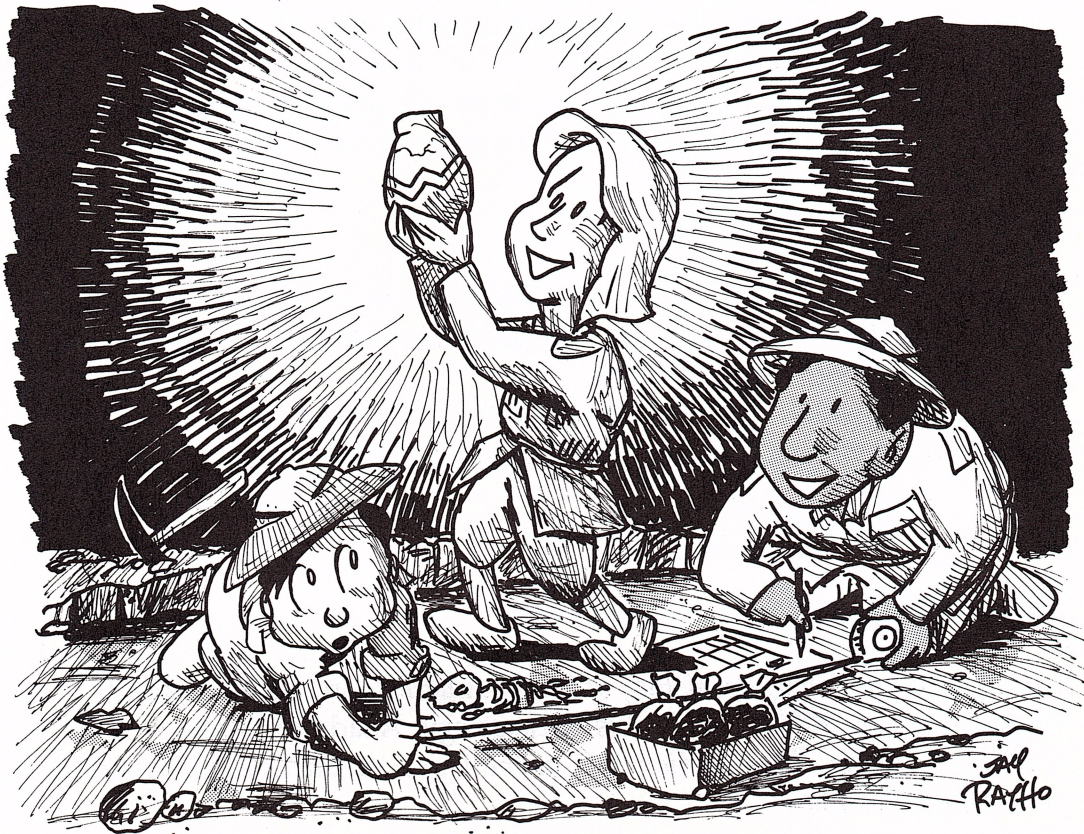
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This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

PART V

MISCELLANEOUS



For Further Study

The books listed below are recommended to individuals interested in additional information on some of the topics discussed in Fugawiland. There are a number of good books on these subjects and we have listed only a few. To learn more, read these books and track down some of the references they list as well. Following a trail of references is the best way to learn more about a particular subject.

General Introductions

- Wendy Ashmore and Robert Sharer, 1988, *Discovering Our Past: A Brief Introduction to Archaeology*, Mayfield.
- Lewis Binford, 1983, *In Pursuit of the Past: Decoding the Archaeological Record*, Thames and Hudson.
- Brian Fagan, 1988, *Archaeology: A Brief Introduction*, 3rd ed., Scott, Foresman.
- Robert Sharer and Wendy Ashmore, 1987, *Archaeology: Discovering Our Past*, Mayfield.
- David Hurst Thomas, 1989, *Archaeology*, 2nd ed., Holt, Rinehart and Winston.
- Robert Wenke, 1984, *Patterns in Prehistory: Humankind's First Three Million Years*, 2nd ed., Oxford University Press.

Methods of Archaeology

- William Dancy, 1981, *Archaeological Field Methods: An Introduction*, Burgess.
- Thomas Hester, Robert Heizer, and John Graham, 1975, *Field Methods in Archaeology*, 6th ed., Mayfield.
- Martha Joukowsky, 1980, *A Complete Manual of Field Archaeology: Tools and Techniques of Field Work for Archaeologists*, Prentice-Hall.

North American and Great Lakes Indians

- Jesse Jennings, 1989, *Prehistory of North America*, 3rd ed., Mayfield.
- Ronald Mason, 1981, *Great Lakes Archaeology*, Academic Press.
- George Quimby, 1960, *Indian Life in the Upper Great Lakes*, University of Chicago Press.

Robert Ritzenthaler, 1985, *Prehistoric Indians of Wisconsin*, 3rd ed., rev. by Lynne Goldstein, Milwaukee Public Museum.

Computers and Data Analysis

David Clarke, 1978, *Analytical Archaeology*, 2nd ed., Columbia University Press.

James E. Doran and Frank R. Hodson, 1975, *Mathematics and Computers in Archaeology*, Harvard University Press.

Stephen Shennan, 1988, *Quantifying Archaeology*, Edinburgh University Press.

Field Work Opportunities

Most major universities run field schools in the summer for undergraduate students. Departments of Anthropology at many universities have a listing of these field school opportunities around the country. The magazine *Archaeology* publishes a list of fieldwork opportunities in the spring of each year. The Earthwatch organization in Boston offers brief fieldwork opportunities in various parts of the world.



GLOSSARY

- Absolute dating:** Dating that assigns a specific, calendar age. Coins and artifacts related to historical events can be absolutely dated. Radiocarbon dating also provides absolute dates.
- Aerial photographs:** Mapping of an area through a series of photos taken at elevations ranging from those of low flying planes to satellites.
- Alidade:** A surveying instrument for making maps, an alidade is basically a ruler with a telescope on top. The mapmaker looks through the telescope to get a line of sight to a measuring rod. The measuring rod provides the elevation of the point being mapped and the distance from the alidade. That point is then drawn on the map.
- Annual Cycle:** The yearly activities of hunting and gathering peoples that involve regular shifts in residence to take advantage of changing resources.
- Archaeology:** The study of the past through material remains.
- Artifact:** Portable object made by people in the past.
- Bundle burial:** Secondary burial of parts of the skeleton after the flesh and soft tissue have disappeared.
- Burial:** Placement of the dead in the ground. Graves found individually or grouped together in distinct burial areas such as cemeteries. Several different kinds of burials can be found, see inhumation, bundle burial, and cremation.
- Classification:** Divisions of objects into groups on the basis of shared characteristics.
- Contour map:** Chart of the topography or shape of the landscape with curving lines used to represent changing elevation.
- Cremation:** Burial of ashes and fragments of carbonized bones from a body that has been burned prior to burial.
- Dating methods:** Determination of the age of archaeological remains.
- Ecofact:** Remains of plants, animals, sediments, and other materials that result from human activity.
- Excavation:** Exposure and recording of buried materials from the past.
- Exotic materials:** Raw materials or finished goods that originate outside of the study area.
- Extended burial:** Simple inhumation of the dead in a grave.
- Extraction sites:** Locations for specific materials or kinds of resources.
- Faunal analysis:** Study of prehistoric animal remains.
- Feature:** Immovable structures or layers, pits and posts in the ground.
- Fieldwork:** Discovery of archaeological sites in the landscape through surveys and excavations.
- Form:** Size and basic shape of the object.
- Fusion:** Closing of sutures between bones of the skull, or joining of ends of limb bones to shaft, used to determine age of death.

- Geophysical prospecting:** Search in the subsoil for prehistoric features by measurement of magnetic variations, conductivity of the soil, or ground penetrating radar.
- Georadar:** Instrument for detection of subsurface features that records differential reflection of radar pulses and thus may be used to identify archaeological remains.
- Ideology:** Shared ideas structuring the relationship between people and the universe, relationships among people, and with other things and beings around them.
- Inhumation:** Extended burial of the whole body, usually found with all the bones in the right position.
- Intuitive sampling:** Subjective choice of sample locations that appear to be most representative of the whole study area.
- Macrofossil:** Visible remains of past animals, insects, fish, or plants at archaeological sites.
- Menu:** List of options for running the computer program that appear on the screen.
- Metal detectors:** Instrument used in surface and subsurface detection that records differential reflection of an electromagnetic field and thus may be used to detect metal objects. Some detectors discriminate between different kinds of metal.
- Midden:** Accumulation of garbage from meals and sometimes other human activities.
- Phosphate analysis:** Measurement of phosphate concentrations in soil as an indicator of past human activity. Phosphate is present in bone, feces, urine, and other organic matters that accumulate around human habitations.
- Physical anthropologist:** Anthropologist studying the physical and biological evolution of our species.
- Place names:** Names of towns and other landmarks may reflect the origin of earlier settlers or what activities or resources attracted them to the area.
- Pollen:** Microscopic reproductive material from plants that is found almost everywhere.
- Posthole:** The easiest way to put a post in the ground is to dig a hole first. Once the post is in place, the hole is filled with dirt. Although the post may be removed or decay, the hole often remains as a circular discoloration in the soil.
- Pot sherds:** Broken pieces of ceramic vessels.
- Provenience:** The location at which an artifact or site is found. The provenience of an item is a way of describing its original location.
- Radiocarbon dating:** Absolute dating method based on the principle of radioactive decay in carbon.
- Random sampling:** Statistical way to take a sample through use of random numbers and without any previous bias.

Reciprocal exchange: Simple, direct, and often equivalent exchange of goods, services, or monetary units between two parties.

Redistribution: Complex and indirect exchange involving a third party or institution that collects goods, services, or monetary units and reallocates at least a portion to others.

Relative dating: Age of the object is evaluated in relation to other objects, like A is older than B (see absolute dating).

Resistivity meter: An instrument used in subsurface detection that measures differences in the conductivity of electrical current and thus may be used to identify archaeological features.

Section: Vertical wall of soil in test pits, trenches, and dissected features. "Section" or "balk" is also the term used for walls of deposits left untouched in the excavation area in order to study the stratigraphy in relation to the horizontal layers.

Settlement: Habitation site.

Site: Accumulation of artifacts representing a place and ecofacts where people lived or carried out certain activities.

Site grid: A set of regularly spaced intersecting north-south and east-west lines, providing the basic reference system for recording of horizontal coordinates within a site. Lines are usually marked with stakes and sometimes string.

Social organization: Roles and relationships among people in society. Organizing principles of society.

Spatial analysis: Examination of the distribution of artifacts within a site or sites across the landscape.

Stratigraphy: The sequence of layers accumulated by natural and/or human activities. Bottom layer is deposited first and is the oldest while the layers above are progressively younger - law of superposition.

Stray finds: Single items found out of context with anything else, usually on the surface of the ground.

Style: Color, texture, and decoration of the object according to choice.

Subsistence: Resources and activities people use to feed themselves.

Survey: A search for artifacts, ecofacts and sites on the ground through aerial photos, field walking, soil analysis, and geophysical prospecting.

Technology: Knowledge and manufacturing techniques that allow conversion of raw materials into finished products and equipment.

Topography: Shape and structure of the earth's surface in terms of relief, water, and other features.

Trade: Complex and indirect transmission of goods or monetary units involving profit making, some sort of market economy, perhaps with a monetary standard.

Students rarely have the opportunity to participate in archaeological fieldwork. With *Adventures in Fugawiland*, students can actually simulate the field experience and analyze the data they collect in an entertaining, educational, and inexpensive manner.

The Software

Using a computer keyboard rather than a shovel and trowel, students will:

- excavate 10 of 25 fictitious, but realistic, prehistoric sites;
 - examine similarities and differences among sites by transforming data into bar charts and scatter graphs;
 - manipulate data to answer computer-generated questions about the sites and apply creative problem-solving techniques to reconstruct Fugawiland's prehistory.
-

The Workbook

As a reference and field manual, the *Fugawiland* workbook helps students to:

- learn the basics of fieldwork and analysis;
 - understand how the computer and the simulation work;
 - conduct a series of studies of stratigraphy, dating, and mapping methods;
 - prepare a report of their investigations.
-

The **interactive nature** of the computer simulation, along with the **visual impact** of maps, site plans, artifact drawings, graphs, and charts, allows students to quickly grasp the methods archaeologists use to reconstruct the past and to recognize patterns in that information.

Adventures in Fugawiland operates on any IBM or IBM-compatible computer with a floppy disk drive and a graphics card. **No computer skills are needed.** Abundant help screens make the program extremely user-friendly.

Other Mayfield titles of interest

Discovering Our Past: A Brief Introduction to Archaeology, by Wendy Ashmore and Robert J. Sharer

Archaeology: Discovering Our Past, by Robert J. Sharer and Wendy Ashmore

Human Antiquity: An Introduction to Physical Anthropology and Archaeology, by Kenneth L. Feder and Michael Alan Park

